ARPAE

Agenzia regionale per la prevenzione, l'ambiente e l'energia

dell'Emilia - Romagna

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Atti amministrativi

Determinazione dirigenziale	n. DET-2018-772 del 01/10/2018
Oggetto	Servizio Idro Meteo Clima. Conferimento incarico di prestazione d'opera intellettuale di natura occasionale all'ing. Andrea Baraldi.
Proposta	n. PDTD-2018-772 del 27/09/2018
Struttura adottante	Servizio Idro-Meteo-Clima
Dirigente adottante	Paccagnella Tiziana
Struttura proponente	Area Agrometeorologia Territorio E Clima
Dirigente proponente	Dott. Botarelli Lucio
Responsabile del procedimento	Botarelli Lucio

Questo giorno 01 (uno) ottobre 2018 presso la sede di Viale Silvani, 6 in Bologna, il Direttore del Servizio Idro-Meteo-Clima, Dott.ssa Paccagnella Tiziana, ai sensi del Regolamento Arpae sul Decentramento amministrativo, approvato con D.D.G. n. 87 del 01/09/2017 e dell'art. 4, comma 2 del D.Lgs. 30 marzo 2001, n. 165 determina quanto segue.

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Oggetto: Servizio Idro Meteo Clima. Conferimento incarico di prestazione d'opera intellettuale di natura occasionale all'ing. Andrea Baraldi.

VISTI:

- gli artt. 2222-2238 c.c.;
- l'art. 7, comma 6, del D. Lgs. n. 165/2001 e successive modificazioni ed integrazioni - ai sensi del quale per esigenze cui non possono far fronte con personale in servizio, le amministrazioni pubbliche possono conferire incarichi individuali con contratti di lavoro autonomo ad esperti di particolare e comprovata competenza;

VISTI ALTRESI':

- l'art. 15 del d. lgs. n. 33/2013 in materia d trasparenza, come riformato dal d. lgs. n. 97/2016, che impone specifici obblighi di pubblicità concernenti gli incarichi di collaborazione e consulenza, quali condizioni di efficacia degli atti di conferimento;
- l'art. 53 del d. lgs. n. 165/2001 in materia di "Incompatibilità, cumulo di impieghi e incarichi", come modificato dalla L. 190/2012, che impone, tra l'altro, la verifica dell'insussistenza di situazioni, anche potenziali, di conflitto di interessi nei confronti dei soggetti incaricati di incarichi esterni da parte dell'amministrazione;

RICHIAMATE:

- la D.G.R. n. 421/2017 avente ad oggetto "Direttiva in materia di lavoro autonomo in Regione Emilia-Romagna";
- D.D.G. n. 130/2017 avente ad oggetto l'approvazione della nuova disciplina in materia di conferimento di incarichi di prestazione d'opera intellettuale con contratti di lavoro autonomo presso Arpae Emilia-Romagna;

CONSIDERATO:

- che Arpae, nell'ambito delle competenze ad essa attribuite dalla Legge Regionale istitutiva n. 44/1995, svolge abitualmente progetti e commesse specifiche a favore della Regione Emilia-Romagna e degli altri Enti di riferimento;
- che per la realizzazione dei suddetti progetti o commesse specifici, nonché per la realizzazione di obiettivi e programmi specifici dell'Agenzia, possono essere conferiti, in conformità e nel rispetto delle vigenti disposizioni di legge, incarichi di prestazione d'opera intellettuale con contratti di lavoro autonomo, riconducibili agli artt. 2222-2238 del codice civile;

PREMESSO:

- che con determinazione n. 518 del 13/06/2017 è stato approvato l'accordo di collaborazione con il Consorzio della Bonifica Renana anche ai fini della sperimentazione e applicazione della tecnologia LET;
- che con determinazione n. 387 del 04/05/2017 è stato approvato l'accordo di collaborazione con il Consorzio di Bonifica Pianura di Ferrara anche ai fini della sperimentazione e applicazione della tecnologia LET;
- che risulta necessario l'espletamento di attività altamente qualificate per la realizzazione della tecnologia LET relativa al progetto: "18LET";
- che la suddetta necessità riveste carattere temporaneo, in relazione alla durata del progetto;
- che, nell'ambito di detto progetto, le attività altamente qualificate da doversi espletare sono, in particolare, le seguenti:
  - analisi delle migliori pratiche e procedure per la generazione automatica di prodotti e servizi informativi operativi, in tempo reale e per fini molteplici, generabili da immagini di osservazione della Terra acquisite principalmente da sensori ottici satellitari;
- che l'oggetto della suddetta prestazione corrisponde alle competenze istituzionali attribuite ad Arpae, con particolare riferimento a LR 44/95 art.5 lettere a), q) e t);
- altresì, che, in conformità a quanto previsto dall'art. 4 comma 1 lettera d) della "Disciplina in materia di conferimento di incarichi di prestazione d'opera intellettuale con contratti di lavoro autonomo presso Arpae Emilia-Romagna", approvata con DDG n. 130/2017, per l'espletamento delle suddetta attività altamente qualificate è necessario il possesso di una particolare e comprovata specializzazione universitaria, nonché di una specifica professionalità, quali:
  - laurea magistrale in fisica o laurea magistrale in ingegneria elettronica;
  - master o dottorato di ricerca in: tematiche di telerilevamento

CONSIDERATO:

- che presso il Servizio Idro-Meteo-Clima risulta accertata l'impossibilità oggettiva di utilizzare le risorse umane disponibili al proprio interno, in ragione del fatto che del fatto che il personale con analoga professionalità risulta impiegato prioritariamente nello svolgimento delle attività istituzionali già programmate;

- altresì, che la ricognizione preliminare effettuata in conformità a quanto previsto dall'art. 7 della suddetta Disciplina approvata con D.D.G. n. 130/2017, ha dato esito negativo come da documentazione conservata agli atti del Nodo e che, pertanto, è stata accertata l'impossibilità oggettiva di procurarsi all'interno dell'Agenzia la figura professionale idonea allo svolgimento della prestazione oggetto dell'incarico in esame;

CONSIDERATO INOLTRE:

- che ai sensi dell'art. 9 della "Disciplina in materia di conferimento di incarichi di prestazione d'opera intellettuale con contratti di lavoro autonomo presso Arpae Emilia-Romagna", approvata con D.D.G. n. 130/2017, si è provveduto ad indire un pubblico avviso (PGSIM/2018/1168 del 31/07/2018) finalizzato al conferimento di un incarico di prestazione d'opera intellettuale di natura occasionale nell'ambito del progetto: "18LET";
- che il suddetto avviso è stato pubblicato sul sito web di Arpae dal giorno 02/08/2018 e che il termine di presentazione delle candidature e dei relativi curricula è scaduto il giorno 22/08/2018;
- che, in conformità a quanto previsto dall'art 10 della suddetta Disciplina approvata con DDG n. 130/2017, è stata effettuata una valutazione comparata dei curricula pervenuti, attribuendo a ciascuno di essi un punteggio assegnato sulla base dei criteri riportati nel citato avviso pubblico, così come si evince dal verbale del giorno 10/09/2018, acquisito agli atti del Nodo con prot. PGSIM/2018/1274 del 10/09/2018;
- che, a seguito della suddetta valutazione, è stata formulata la specifica graduatoria approvata quale allegato n. A) al citato verbale prot. PGSIM/2018/1274 del 10/09/2018, e successivamente pubblicata sul sito istituzionale dell'Agenzia;
- che, in conformità a quanto previsto dal citato avviso, si è provveduto, altresì, ad espletare il colloquio con il soggetto risultato idoneo alla valutazione del curriculum, e che è stata formulata la specifica graduatoria approvata quale allegato n. 2 al verbale prot. PGSIM/2018/1324 del 24/09/2018 e successivamente pubblicata sul sito istituzionale dell'Agenzia;

RILEVATO:

- che, dall'esito della procedura comparativa ordinaria per il conferimento dell'incarico di prestazione d'opera intellettuale sopradescritta, il soggetto collocato al primo posto della

graduatoria approvata con il citato verbale prot. PGSIM/2018/1324 del 24/09/2018 risulta essere 1'ing. Andrea Baraldi;

RITENUTO :

- pertanto, di conferire un incarico di prestazione d'opera intellettuale di natura occasionale all'ing. Andrea Baraldi, che possiede la necessaria elevata professionalità, come da curriculum allegato A) al presente atto, in merito allo svolgimento delle attività sopra elencate;

VALUTATO:

- che, ai sensi dell'art. 53 comma 14 del d. lgs. 165/2001 (come modificato dall'art. 1 comma 42 della L. 190/2012), nei confronti dell'ing. Andrea Baraldi non sussistono situazioni, anche potenziali, di conflitto di interessi, come risulta dalla dichiarazione allegato B) al presente atto;

PRECISATO:

- che la suddetta dichiarazione tiene conto anche delle disposizioni di cui al DPR n. 62/2013 (Codice di comportamento dei dipendenti pubblici), per quanto compatibili con il contratto di lavoro autonomo di cui al presente atto;
- altresì, che la suddetta dichiarazione contiene le informazioni relative allo svolgimento di incarichi o alla titolarità di cariche in enti di diritto privato regolati o finanziati dalla Pubblica Amministrazione o allo svolgimento di attività professionali, in conformità a quanto previsto dall'art. 15 c. 1 lett. c) del D. Lgs. n. 33/2013;

RITENUTO ALTRESI':

- di stabilire che il suddetto incarico decorra dall'08/10/2018 con termine entro il 31/12/2018;
- di approvare lo schema di contratto, allegato C) al presente atto quale parte integrante e sostanziale, destinato a formalizzare la totalità degli accordi tra Arpae e l'ing. Andrea Baraldi;
- di riconoscere all'ing. Andrea Baraldi, per le prestazioni fornite, un compenso netto di Euro 4.900,00;

RITENUTO INOLTRE:

- di disporre la pubblicazione del presente provvedimento sul sito istituzionale dell'ente, in conformità a quanto previsto dall'art. 15 del d. lgs. 33/2013;

DATO ATTO:

- che il conferimento dell'incarico di prestazione d'opera intellettuale di natura occasionale di cui al presente provvedimento avviene nel rispetto delle vigenti disposizioni in materia di contenimento della spesa pubblica;
- che, in conformità a quanto prescritto dall'art. 7 della richiamata "Disciplina in materia di conferimento di incarichi di prestazione d'opera intellettuale con contratti di lavoro autonomo presso Arpae Emilia-Romagna" approvata con DDG n. 130/2017, come risulta da specifica scheda conservata agli atti del Nodo, sono stati acquisiti i preventivi pareri del Responsabile dell'Area Sviluppo Risorse Umane e Relazioni Sindacali e del Responsabile dell'Area Bilancio e Controllo Economico, rispettivamente per il parere sul rispetto dei presupposti di legittimità di cui all'art. 4 della citata Disciplina e di coerenza con la programmazione degli incarichi, nonché con i vincoli finanziari e con il budget assegnato;

DATO ATTO ALTRESI':

- che l'incarico oggetto del presente provvedimento è previsto nella programmazione di cui al documento di previsione del fabbisogno di massima relativo al conferimento di incarichi di prestazione d'opera intellettuale con contratto di lavoro autonomo per l'anno 2018, approvato con D.D.G. n. 117 del 17/11/2017;

RICHIAMATA:

- la D.D.G. n. 127 del 22/12/2017 recante: l' Approvazione del Bilancio pluriennale di previsione per il triennio 2018-2020, del Piano Investimenti 2018-2020, del Bilancio economico preventivo per l'esercizio 2018, del Budget generale e della Programmazione di Cassa per l'esercizio 2018;
- la D.D.G. n. 128 del 22/12/2017 recante: l'Approvazione delle linee guida e assegnazione ai Centri di Responsabilità dei budget di esercizio e investimenti per l'esercizio 2018 con particolare riferimento alle indicazioni in materia di conferimenti di collaborazioni esterne per lo svolgimento di attività da realizzarsi all'interno dei Nodi;
- il Regolamento per il decentramento amministrativo, come modificato con delibera del Direttore Generale n. 87 del 01/09/2017;

SU PROPOSTA:

- del dott. Lucio Botarelli, Responsabile dell'Area Agrometeorologia, Territorio e Clima il quale ha espresso parere favorevole in merito alla regolarità amministrativa del presente atto;

ACQUISITO:

- il parere di regolarità contabile espresso dalla referente amministrativa rag. Daniela Ranieri;

DATO ATTO:

- che si è provveduto a nominare il dott. Lucio Botarelli quale responsabile del procedimento ai sensi della L. n. 241/1990;

DETERMINA

1. di conferire, per quanto esposto in premessa, un incarico di prestazione d'opera intellettuale di natura occasionale, all'ing. Andrea Baraldi, che possiede la necessaria elevata professionalità, come da curriculum allegato A) al presente atto, per lo svolgimento delle seguenti attività altamente qualificate:
   - analisi delle migliori pratiche e procedure per la generazione automatica di prodotti e servizi informativi operativi, in tempo reale e per fini molteplici, generabili da immagini di osservazione della Terra acquisite principalmente da sensori ottici satellitari;
2. di stabilire che il suddetto incarico decorra dall'08/10/2018 con termine entro il 31/12/2018;
3. di approvare lo schema di contratto, allegato C) al presente atto quale parte integrante e sostanziale, destinato a formalizzare la totalità degli accordi tra Arpae e l'ing. Andrea Baraldi;
4. di riconoscere all'ing. Andrea Baraldi per le prestazioni fornite, un compenso lordo di Euro 4.900,00;
5. di dare atto che il costo complessivo relativo al presente provvedimento pari ad Euro 4.900,00, avente natura di "Incarichi di ricerca" è a carico dell' esercizio 2018 ed è compreso nel bilancio economico preventivo annuale con riferimento con riferimento al progetto "18LET";
6. di disporre la pubblicazione del presente provvedimento sul sito istituzionale dell'ente, in conformità a quanto previsto dall'art. 15 del d. lgs. 33/2013.

Allegati:

A) curriculum ing. Baraldi

B) dichiarazione

C) schema di contratto

IL DIRETTORE DEL
SERVIZIO IDRO-METEO-CLIMA
(F.to Dott.ssa Tiziana Paccagnella)

Curriculum vitae

PERSONAL INFORMATION

Andrea Baraldi

Sex | Date of birth | Nationality

POSITION

Senior Researcher, Ph.D.

WORK EXPERIENCE

16/02/2018–Present

Senior scientist

Agenzia Spaziale Italiana (Italian Space Agency, ASI)
Via del Politecnico, 00133 Rome (Italy)
www.asi.it

- Assigned to the Technical Scientific Coordination (Coordinamento Tecnico Scientifico, COT) unit, Space Science Data Center (SSDC) group, sub-domain Earth Observation (EO).
- Responsible of contributing to the development of EO sensory data-derived value-added information products and processes, defined at the levels of abstraction of: (i) information processing system requirements specification, (ii) information/knowledge representation, (iii) system design (architecture), (iv) algorithm, (v) implementation, (vi) integration and (vi) quality assessment for testing and validation purposes, based on a minimally dependent and maximally informative (mDMI) set of outcome and process quantitative quality indicators (OP-Q2Is), selected in compliance with the FAIR criteria (Findable, Accessible, Interoperable, Reusable) to guarantee interoperability with national and international EO data and information access platforms, if any.

01/10/2016–30/10/2017

Senior scientist

Department of Geoinformatics – Z_GIS, University of Salzburg, Salzburg (Austria)

Funded project: Austrian Research Promotion Agency (FFG), project call "Proposals to ICT of the Future", project title: SemEO (Semantic enrichment of optical EO data to enhance spatio-temporal querying capabilities).

2-of-12 months overlapping with the 18-month PhD 2nd/3rd-year training period abroad, University of Naples Federico II, Department of Agricultural Sciences, Naples, Italy.

As follow-up of the funded FFG AutoSentinel-2/3 project (2015), the SemEO project aims at further developing the Earth Observation (EO) Image Understanding For Semantic Querying (EO-IU4SQ) system prototype, capable of automated near real-time generation of ESA EO Level 2 product from each single-date EO multi-spectral (MS) image stored in multi-source EO big image databases as necessary not sufficient pre-condition for semantic querying the database. Output products generated by the closed-loop EO-IU4SQ system monotonically increase their value-added with closed-loop iterations. An ESA EO Level 2 product is defined as a MS image corrected for geometric, atmospheric, adjacency and topographic effects, stacked with its data-derived scene classification map (SCM) whose land cover (LC) class legend is general-purpose, user- and application-independent and includes quality layers such as cloud and cloud-shadow. No ESA Level 2 product has ever been systematically generated at the ground segment to date. No semantic content-based image retrieval (SCBIR) system has ever been developed in operating mode by the remote sensing community either. Our working hypothesis was that existing content-based image retrieval (CBIR) systems support no semantic querying because they lack EO image understanding capabilities, required to transform EO sensory data into EO value-adding information products of symbolic quality. Our automated near- real-time ESA EO Level 2 product generator is input with multi-spectral (MS), super-spectral-spectral (SS) and hyper-spectral (HS) spaceborne images provided with radiometric calibration metadata, such as those acquired by Sentinel-2 MSI, Sentinel-3 OLCI and SLSTR, ENVISAT AATSR, ERS-2 ATSR-2, MSG, Landsat-4/5/7 TM, Landsat-8 OLI, ASTER, MODIS, SPOT-4/5/6/7, Pleiades-1A/B, DMC, FORMOSAT, RapidEye, IKONOS, QuickBird, WorldView-2/3/4, APEX,

AVIRIS, Hyperion, etc. For comparison purposes in terms of scalability to changes in sensor specifications, the Sentinel 2 Correction (Sen2Cor) Prototype Processor developed by ESA in collaboration with Telespazio VEGA, to be run on user side, is input with Sentinel-2 MSI imagery exclusively.

01/03/2016–01/07/2016

Visiting scientist

Computer Vision Center (CVC), Universidad Autonoma de Barcelona (UAB), Barcelona (Spain)

5 months overlapping with the 18-month PhD 2nd/3rd-year training period abroad, University of Naples Federico II, Department of Agricultural Sciences, Naples, Italy.

Objective: Survey of the state-of-the-art in deep convolutional neural network (DCNN) design and implementation issues, with special emphasis on autonomous driving vehicle control system applications. My interest in this application field of computer vision dates back to Jan. 2015, when I presented at Vision Lab (VisLab) srl, spinoff of the University of Parma, Italy, a critical analysis of existing publications co-authored by Prof. Alberto Broggi. General Manager at VisLab srl (acquired by Silicon-Valley company Ambarella Inc. on June 2015) and a professor of Computer Engineering at the University of Parma in Italy, Prof. Alberto Broggi has been pioneering the field of machine vision applied to driverless cars and unmanned vehicles in general. At CVC-UAB, I searched for further developments in DCNN design and implementation, such as: integration of inductive learning-from-data filter parameter selection with physical model-based wavelet filter banks consistent with pre-attentive visual perception (e.g., Mach band illusion in ramp-edge detection), foveated imaging where spatial filter resolution is eccentricity-dependent in combination with focus-of-visual-attention mechanisms for fixation point selection based on hybrid (deductive/top-down and inductive/bottom-up) inference.

01/07/2013–31/01/2016

Senior scientist

Department of Geoinformatics – Z_GIS, University of Salzburg, Salzburg (Austria)

- FP7-Space project G-SEXTANT (Consolidation of a standardized portfolio of Earth Observation products and pre-operational services in the frame of pre-defined scenarios), Role: Project collaborator.
- Austrian Research Promotion Agency (FFG) - Project call ASAP11, project title: AutoSentinel2/3 (Knowledge-based pre-classification of Sentinel-2/3 images for operational product generation and content-based image retrieval). Role: Co-leader.
    - The AutoSentinel2/3 project started the research & technological development of an innovative Earth Observation (EO) Image Understanding For Semantic Querying (EO-IU4SQ) system prototype, capable of automated near real-time generation of ESA EO Level 2 product from each single-date multi-spectral (MS) Sentinel-2 MSI and Sentinel-3 OLCI and SLSTR image stored in multi-source EO big image databases as necessary not sufficient pre-condition for semantic querying the database. No ESA Level 2 product has ever been systematically generated at the ground segment to date. No semantic content-based image retrieval (SCBIR) system has ever been developed in operating mode by the remote sensing community either. Also refer to the FFG follow-up project SemEO.
- 10 months overlapping with the 18-month PhD 2nd/3rd-year training period abroad, University of Naples Federico II, Department of Agricultural Sciences, Naples, Italy.

01/07/2013–01/07/2015

Adjunct Associate Professor

Dept. of Geographical Sciences, Univ. of Maryland, College Park (USA)

Co-supervision of one PhD student

01/02/2015–31/03/2015

PhD Fellowship

Ben Gurion University of the Negev, Sde Boker (Israel)

Fp7-Experimentationin Ecosystem Research (ExpeER) project. Title of the ExpeER project proposal: Prior Spectral Knowledge for Ecosystem Service Monitoring and Understanding (PriorSpecK4ECOS).

1 month overlapping with the 18-month PhD 2nd/3rd-year training period abroad, University of Naples Federico II, Department of Agricultural Sciences, Naples, Italy.

Objective: biophysical variable estimation, e.g., leaf area index and crop water requirement estimation, from spaceborne/airborne multi-spectral and hyper-spectral imagery.

01/02/2014–28/02/2014 **Senior Scientist Fellowship**

German Aerospace Center (DLR), Institute of Remote Sensing Technology, Oberpfaffenhofen (Germany)

German Academic Exchange Service (DAAD), Senior Scientist Fellowship titled: Advances in spaceborne image automatic near real-time pre-classification and segmentation

01/09/2010–30/06/2013 **Research Associate Professor**

Dept. of Geographical Sciences, Univ. of Maryland, College Park (USA)

NASA Land-Cover and Land-Use Change (LCLUC) Program, Automatic pre-classification and segmentation of the Landsat Web-Enabled Data set (WELD) at continental and global spatial extents

- Development of the Satellite Image Automatic Mapper (SIAM), a lightweight computer program eligible for use in mobile software applications and capable of automated near real-time hyperpolyhedralization of a multi-spectral (MS) reflectance space into MS color names, superpixel detection and vector quantization quality assessment in the image-domain (please, refer to my personal web page: siam.andreabaraldi.com). SIAM can be input with any MS, super-spectral (SS) or hyper-spectral image (HS) acquired by past, present or future imaging sensor radiometrically calibrated into top-of-atmosphere reflectance (TOARF) or surface reflectance (SURF) values. Hence, SIAM can map into MS color names automatically and in near real-time any spaceborne optical image acquired by MS, SS, or HS imaging sensors such as Sentinel-2 MSI, Sentinel-3 OLCI and SLSTR, ENVISAT AATSR, ERS-2 ATSR-2, MSG, Landsat-4/5/7 TM, Landsat-8 OLI, ASTER, MODIS, SPOT-4/5/6/7, Pleiades-1A/B, DMC, FORMOSAT, RapidEye, IKONOS, QuickBird, WorldView-2/3/4, APEX, AVIRIS, Hyperion, etc.
- Large-scale burned area product generation from Landsat image time-series, where SIAM provides automated near real-time single-date superpixel detection and color naming employed as input to a spatial context-sensitive decision tree for burned area classification through time.
- SIAM Stage 4 Validation by independent means at continental scale on an annual Web-Enabled Landsat data (WELD) image composite time series, in agreement with the Group on Earth Observations (GEO) Quality Assurance Framework for Earth Observation (QA4EO) calibration/validation (Cal/Val) requirements.

01/03/2009–30/11/2009 **Scientific consultant**

SARMAP, Purasca (Switzerland)

Development of the OpticalScape commercial software toolbox (never released)

01/02/2005–01/02/2009 **Scientific officer**

European Commission Joint Research Centre (EC-JRC), Ispra (VA) (Italy)

Affiliated to the Spatial Data Infrastructures (SDI) unit of the Institute for Environment and Sustainability (IES). Development of operational remote sensing image understanding systems for vegetation monitoring, cloud detection, flood detection, fire detection, urban area monitoring at either local (regional), continental or global scale.

01/08/2003–31/10/2004 **Research associate**

Institute of Intelligent Systems for Automation (ISSIA)-National Research Council (CNR), Bari (Italy)

FP6-LEWIS (Landslide Early-Warning Integrated System). Research and development in computer vision, pattern recognition and remote sensing image understanding.

01/06/2002–01/06/2003 **Research associate**

Institute of Intelligent Systems for Automation (ISSIA)-National Research Council (CNR),

Bari (Italy)

Research and development of context-sensitive neuro-fuzzy clustering algorithms for multi-source image analysis

01/05/2000–01/05/2002 **Post-doctoral researcher**

European Commission Joint Research Centre (EC-JRC), Ispra (VA) (Italy)

Affiliated to the Global Vegetation Monitoring (GVM) unit of the Institute for Environment and Sustainability (IES). Title of the research activity: "Development and validation of algorithms for the automatic thematic information extraction from wide area radar maps of forest ecosystems."

01/06/1999–01/04/2000 **Research associate**

Istituto di Scienze dell'Atmosfera e del Clima (ISAC)-National Research Council (CNR), Bologna (Italy)

Machine learning and computer vision applications to remote sensing images.

01/12/1997–01/06/1999 **Post-doctoral researcher**

International Computer Science Institute (ICSI), Berkeley (USA)

Affiliated to the Artificial Intelligence group led by Prof. J. Feldman, ICSI and UC Berkeley. Title of the research activity: "Scatter-partitioning neural networks for image segmentation."

01/03/1993–30/11/1997 **Research associate**

Istituto per lo studio delle Metodologie Geofisiche Ambientali (IMGA)-National Research Council (CNR), Modena (Italy)

Main research interests: low-level visual processing, with special regard to texture analysis, and neural network applications to unsupervised data quantization and unsupervised data clustering.

01/01/1991–31/03/1993 **Consultant**

European Space Agency (ESA)-ESRIN, Frascati (Italy)

Responsible of the quality assessment of commercial geographic information systems (GISs) and of the development of raster modules in vector-based GISs (e.g., System9).

01/06/1989–30/12/1990 **Military service: Lieutenant in the Technical Corp**

Istituto Geografico Militare, Firenze (Italy)

Responsible for the development of satellite image segmentation and classification algorithms to be integrated with GIS (MicroStation by Intergraph).

01/02/1989–26/05/1989 **Consultant**

CIOC-National Research Council (CNR), Bologna (Italy)

Responsible for the development of object-oriented geographic information representation models and for the assessment of Geographic Information Systems (MicroStation by Intergraph).

EDUCATION AND TRAINING

01/03/2014–28/02/2017 **PhD in Agriculture and Agribusiness**

University of Naples “Federico II”, Department of Agricultural Sciences, Naples (Italy)

PhD dissertation (defense held on 16/05/2017): Pre-processing, classification and semantic querying of large-scale Earth observation spaceborne/airborne/terrestrial image databases: Process and product innovations

- Image pre-processing

- Self-organizing color constancy applied to uncalibrated panchromatic and color images, such as those acquired by consumer-level cameras mounted in mobile devices, such as smartphones and tablets, and those dealt with by unmanned aerial vehicles (UAVs), e.g., in precision agriculture applications, and by autonomous driving vehicle control systems.
- Absolute radiometric calibration of digital numbers (DNs) into top-of-atmosphere reflectance (TOARF) values.
- Automated near real-time ESA EO Level 2 product generation where a multi-spectral (MS) image is radiometrically calibrated from TOARF into surface reflectance (SURF) values corrected for atmospheric, topographic and adjacency effects.

- Near-orthogonal image analysis (decomposition) and near lossless image synthesis (reconstruction) based on an original wavelet-based spatial filter bank of even-symmetric filters and Gaussian filters.
- Visual feature extraction, raw primal sketch in pre-attentive vision.
  - Color naming in radiometrically calibrated MS imagery. Satellite Image Automatic Mapper (SIAM): lightweight computer program eligible for use in mobile software applications and capable of automated near real-time MS reflectance space hyperpolyhedralization into a dictionary of MS color names, superpixel detection and vector quantization quality assessment in the image-domain.
  - Color naming in radiometrically uncalibrated RGB imagery, either true- or false-color, such as those acquired by consumer-level cameras mounted in mobile devices, such as smartphones and tablets, and those dealt with by UAVs, e.g., in precision agriculture applications, and by autonomous driving vehicle control systems. Color naming in radiometrically uncalibrated RGB imagery must be employed in series to a color constancy image-pre-processing. RGB Image Automatic Mapper (RGBIAM): lightweight computer program eligible for use in mobile software applications and capable of automated near real-time RGB data cube polyhedralization into a dictionary of RGB color names, superpixel detection and vector quantization quality assessment in the image-domain.
  - Well-posed (deterministic) two-pass connected-component multi-level image labeling algorithm in operating mode (including small run-time memory occupation).
  - Original automated near real-time post-classification change/no-change detection in MS image time-series: SIAM-based change/no-change detection of MS color names through time.
  - Image contour detection. Original automated multi-scale wavelet-based zero-crossing image-contour detection in either panchromatic or color images, consistent with human visual perception (e.g., Mach bands illusion).
  - Image segmentation. Original automated multi-scale wavelet-based zero-crossing image-segment detection in either panchromatic or color images, consistent with human visual perception (e.g., Mach bands illusion).
  - Keypoint detection. Original automated multi-scale wavelet-based keypoint detection (simulating end-stopped cells in human vision): end-point, corner, T-junction, X-junction.
  - Local shape descriptors. Original minimally dependent and maximally informative set of planar shape descriptors: scale-invariant roundness, elongatedness, straightness of boundaries, simple connectivity, rectangularity and convexity.
- Visual feature extraction, full primal sketch in pre-attentive vision.
  - Texture segmentation (perceptual spatial grouping of texels). Original automated multi-scale binary texture profile generation.
- Attentive vision (classification).
  - Automated near real-time ESA EO Level 2 product generation where a multi-spectral (MS) image, radiometrically calibrated from TOARF into surface reflectance (SURF) values for atmospheric, topographic and adjacency effects, is stacked with its scene classification map (SCM). The general-purpose, application- and user-independent SCM legend is implemented as the FAO Land Cover Classification System (LCCS) taxonomy at the 3-level 8-class Dichotomous Phase (DP), augmented with quality layers such as cloud and cloud-shadow.
  - High-level hybrid feedback modular system for convergence-of-visual-evidence, where visual information primitives are: color names, texture, local shape, inter-object spatial topological (e.g., adjacency, inclusion, etc.) and spatial non-topological (e.g., distance measure, angle measure)

relationships .

- Modeled world (world ontology, world model, mental world): conceptual Entity-Relationship (ER) model, graphically represented as a semantic network with entities as nodes and relationships as arcs between nodes, provided with an algebra for spatiotemporal ER and event modeling.
- Incremental learning in a closed-loop hybrid (combined deductive and inductive) inference system architecture. Research & development of the Earth Observation (EO) Image Understanding For Semantic Querying (EO-IU4SQ) system prototype, capable of automated near real-time generation of ESA EO Level 2 product from each single-date EO multi-spectral (MS) image stored in multi-source EO big image databases as necessary not sufficient pre-condition for semantic querying the database. Output products generated by the closed-loop EO-IU4SQ system monotonically increase their value-added with closed-loop iterations.

- Automated stratified (layered, masked, driven-by-prior-knowledge) estimation of biophysical canopy variables from EO optical imagery. (i) Automated stratified multivariate estimation of a leaf area index (LAI), alternative to the Clevers reflectance model for LAI estimation (CLAIR), whose input is a univariate Weighted Difference Vegetation Index (WDVI). (ii) Automated stratified multivariate estimation of crop water requirements, alternative to: (a) the empirical crop coefficient (Kc)-normalized difference vegetation index (NDVI) relationship for canopy evapotranspiration estimation in comparison with evapotranspiration of a reference canopy, and (b) the FAO-56 procedure for the semi-empirical estimation of canopy evapotranspiration from meteorological data and crop variables, such as LAI and surface albedo, estimated from EO data.
- Original perceptual visual quality metric (PVQM) between a test and a reference image-pair, consistent with human visual perception, e.g., consistent with the Mach bands illusion in ramp-edge detection.
- Outcome and process quantitative quality assessment.
  - SIAM Stage 4 Validation by independent means at continental scale on an annual Web-Enabled Landsat data (WELD) image composite time series, in agreement with the Group on Earth Observations (GEO) Quality Assurance Framework for Earth Observation (QA4EO) calibration/validation (Cal/Val) requirements.
  - Sentinel-2 10 m resolution ESA EO Level 2 product Stage 2 Validation in comparison with the European Environment Agency GIO Land High Resolution Layers (HRLs), 20 m resolution. National scale: Austria.
  - Cloud/cloud-shadow accuracy assessment in comparison with the GaoFen-1 image and reference dataset available online (http://sendimage.whu.edu.cn/en/mfc/).

01/06/1993–14/06/1994

1st Level Master in Software Engineering

University of Padoa and Purdue University, West Lafayette, Indiana, USA, Padova (Italy)

01/09/1982–01/02/1989

Laurea (MS) degree in Electronic Engineering

University of Bologna, Bologna (Italy)

Title of the Laurea thesis: Segmentation and classification of high resolution satellite images

PERSONAL SKILLS

Mother tongue(s): Italian

Foreign language(s)

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C2	C2	C2	C2
	High School Diploma				

Levels: A1 and A2: Basic user - B1 and B2: Independent user - C1 and C2: Proficient user
Common European Framework of Reference for Languages

Communication skills

Experienced at working in a European and multicultural dimension. Excellent adaptability to new situations and environments. Excellent communication and writing skills.

Organisational / managerial skills

Extensive experience of participating in research projects, managing human resources and teaching.

Job-related skills

- Teaching and leadership capabilities.
- Scientific domains of expertise.
  - Software engineering.
  - Cognitive science. Cognitive science is the interdisciplinary scientific study of the mind and its processes. Mental faculties of concern to cognitive scientists include perception, language, memory, attention, reasoning, and emotion. Cognition is synonym of (biological) intelligence, learning, adaptation, self-organization. Multi-disciplinary cognitive science encompasses linguistics, philosophy, anthropology, neuroscience, psychophysics, artificial intelligence and machine learning. According to cybernetics an "artificial mind" (software) cannot be pursued independently of an "electronic brain" as its physical support (hardware). This "connectionist approach" is alternative to the "symbolic approach" promoted by traditional artificial intelligence where an artificial mind is investigated independently of its physical support.
  - Machine learning-from-data.
    - Supervised (labeled) data learning for classification and function regression, e.g., deep convolutional neural networks (DCNNs).
    - Unsupervised (unlabeled) data learning for density function estimation, vector quantization and unsupervised data clustering, including self-organizing topology preserving neural networks (TPNN) capable of: (i) generating/removing processing units dynamically and (ii) generating/removing lateral connections dynamically.
  - Artificial intelligence. Top-down (deductive) prior knowledge transfer from human-to-machine, typical of artificial intelligence, is required as initial condition by inherently ill-posed inductive data learning algorithms, typically investigated by machine learning, to become better conditioned for numerical solution. To take advantage of the unique features of each and overcome their shortcomings, top-down/deductive learning-by-rule subsystems (equivalent to genotype) and bottom-up/inductive learning-from-examples subsystems (equivalent to phenotype) are typically combined into hybrid inference systems.
    - Conceptual Entity-Relationship knowledge/information representation combined with state diagrams (finite state automata) to provide a mental model of the 4D spatiotemporal physical world, known as world model or geospatiotemporal ontology. Noteworthy, processes are nodes in flow charts corresponding to edges in state diagrams. In a semantic network, entities are nodes and relationships are arcs between nodes. A space-time world model consists of: (1) continuants, subdivided into (a) geo-objects (geospatial categorical variables provided with semantics), (b) geo-fields (geospatial numeric variables) and (c) field-objects (categorical variables as discretized geo-fields). (2) Occurrents, which means events/(end of) processes. An event is a change in state of a continuant. A continuant in the space-time real-world domain is described by attributes: (i) space (x, y, z), (ii) time t, (iii) numeric and categorical variables, e.g., appearance properties, and (iv) a (symbolic) theme, belonging to a finite and discrete vocabulary (codebook) of codewords in a geospatial ontology. A phenomenon is any ensemble of states and/or changes in state of one or more continuants observed in time while space or theme are either controlled or fixed.
    - Expert system design and development: fact base, knowledge base (first-principle models, rules and metarules), inference engine (provided with four types of logical reasoning: deduction, abduction, induction and transitivity), system requirements specification in user-speak by domain experts, statement of external functionalities in techno-speak by knowledge engineers.
  - Pattern (e.g., spectral signature) recognition, including (2D) planar shape descriptors.
  - Multiple source data fusion, e.g., optical and synthetic aperture radar (SAR) imagery fused at semi-symbolic or symbolic levels of abstraction, rather than at the sub-symbolic level of sensory data (observables).
  - Computer vision (computer-driven scene-from-image reconstruction and understanding) consistent with human visual perception (e.g., Mach bands illusion).

- Image pre-processing (enhancement) and feature extraction consistent with human vision, e.g., color constancy, color naming.
- Primary visual cortex mechanisms at the raw primal sketch (e.g., wavelet filter banks of even- and odd-symmetric spatial filters for zero-crossing image-contour detection, end-stopped cells for keypoint detection, automatic zero-crossing segment detection from zero-crossing image-contours) and full primal sketch (texture segmentation as perceptual spatial grouping of texels).
- Attentional vision, e.g., foveated imaging system in combination with a hybrid (combined deductive and inductive) focus-of-attention mechanism.

- Remote sensing.
  - Systematic ESA Level 2 product generation at the ground segment, encompassing a single-date multi-spectral (MS) image radiometrically calibrated into surface reflectance values corrected for atmospheric, topographic and adjacency effects, stacked with its general-purpose, user- and application-independent scene classification map (SCM).
  - Satellite Image Automatic Mapper (SIAM): proprietary lightweight computer program eligible for use in mobile software applications and capable of automated near real-time hyperpolyhedralization of a multi-spectral (MS) reflectance space into MS color names, superpixel detection and vector quantization quality assessment in the image-domain.
  - RGB Image Automatic Mapper (RGBIAM): proprietary lightweight computer program eligible for use in mobile software applications and capable of automated near real-time polyhedralization of an RGB cube into RGB color names, superpixel detection and vector quantization quality assessment in the image-domain
  - Self-organizing color constancy for uncalibrated color image harmonization through acquisition time, space and imaging sensors.
- Geographic Information Science (GIScience), capable of geospatial reasoning to answer questions such as: what, where and how/why? It deals with discrete geospatial objects (geo-objects) of semantic (symbolic), numeric variables (geo-fields) and discretized numeric variables of sub-symbolic quality (field-objects). In geographic information systems (GIS), geo-fields are raster numeric variables while geo-fields and field-objects are raster categorical variables eligible for vector data representation.

Digital skills

SELF-ASSESSMENT				
Information processing	Communication	Content creation	Safety	Problem solving
Proficient user	Proficient user	Proficient user	Basic user	Basic user

Digital skills - Self-assessment grid

Programming languages: C/C++, Fortran, Basic, Pascal, Prolog, MATLAB, IDL

Operating systems: MS Dos, Windows, Unix

Commercial image processing software toolboxes: ENVI by Research Systems Inc.

Commercial software toolboxes for data visualization, analysis and processing: MATLAB by the Math Works Inc, IDL by Research Systems Inc.

Geographic information systems: ArcGIS, ArcCatalog.

Other commercial software tools: MS Word, MS PowerPoint, MS Excel, MS Project, MS Explorer, MS Visual Studio.

Other skills

Teaching experience

- Sept. 12-13, 2016 Contributor to the GEOBIA 2016 Doctoral Colloquium, conceived for PhD students and recent postdocs, in collaboration with senior OBIA researchers from Z-GIS and ITC/the University of Twente, Enschede, the Netherlands, in the framework of the GEOBIA 2016 Conference, 14-16 September 2016 at ITC/the University of Twente, Enschede, the Netherlands.

- June 2-3, 2014 Workshop for Ph.D. and MS students – Hands on the Satellite Image Automatic Mapper™ software toolbox, In collaboration with Prof. Thomas Blaschke, Prof. Stefan Lang and Prof. Dirk Tiede, Department of Geoinformatics - Z_GIS, Integrated Spatial Analysis (ISA), University of Salzburg.
- March – May 2014 Visiting professor, University of Modena and Reggio E., Italy, Academic year in Electronic Engineering: 2013-1014, Teaching course (30 hours + testing) for M.S. and Ph.D. students in “Advanced Electronic Systems: Neuromorphic Engineering - Adaptive oxide electronics (memristors) for fabricating devices to mimic human brain functionalities". Hosting professor: Prof. P. Pavan.
- Feb. 2011 Teaching assistant in the Spring 2011 Geog778B course, titled "Remote Sensing for Global Carbon Monitoring," University of Maryland, Department of Geographical Sciences, Teaching Professor: Dr. L. Boschetti.
- Dec. 2003 Teaching assistant in "Tecniche avanzate di elaborazione dei segnali," corso di Laurea in Ingegneria e Telecomunicazioni, academic year 2003-2004, first semester, Univ. di Trento, Teaching Professor: Prof. L. Bruzzone.
- Dec. 2002 Teaching assistant in "Tecniche avanzate di elaborazione dei segnali," corso di Laurea in Ingegneria e Telecomunicazioni, academic year 2002-2003, first semester, Univ. di Trento, Teaching Professor: Prof. L. Bruzzone.

Participation in training (mentoring)

- 6 PhD students.
- 5 MS students.

Professional society activities

- Jan. 2001-May 2006. Associate editor of the IEEE Transactions on Neural Networks journal.
- Sep. 2012. Program Committee, Workshop at the GIScience conference, 18-20 September 2012, Columbus, Ohio: Geographic object based multi-scale analysis: Developing a methodological framework for GIScience.
- Sept. 28, 2015 (invited) European Commission - European Space Expo, Milan, Italy, 18 Sept. – 4 Oct. 2015: Food and Space. Andrea Baraldi, "Agricultural Applications of Airborne/Spaceborne Images – If You Don't Measure It, You Can't Improve It," University of Salzburg and University of Naples Federico II.

Refereeing

> 90 papers submitted for consideration for publication in IEEE Trans. Fuzzy Systems:5, IEEE Trans. Neural Networks: 43, IEEE Trans. Image Processing: 3, IEEE Trans. Knowledge and Data Engineering: 1, IEEE Trans. Systems, Man, and Cybernetics: 2, IEEE Trans. Geoscience and Remote Sensing: 26, IEEE Geoscience and Remote Sensing Letters: 2, Remote Sensing: 4.

Participation in European, international and national programmes

Institution of affiliation, Project Name and Identifier, Funded by, Duration, Own amount / Budget, Other partners

- ISSIA-CNR (WP Leader) Landslide Early-Warning Integrated System (LEWIS), EVG1-CT-2001-00055, EU-EC, 2002-2006, € 190.00 / ..., Univ. Bari (PI), Canada Centre of Remote Sensing (CCRS), Univ. of Surrey, Silogic, Planetek, Altamira.
- MEEO srl Italy (PI), Knowledge-centred Earth Observation (KEO) Extensions and Installations (KEI), ESA, 2007-2009, € 196.241, none.

- MEEO srl Italy (PI), Classification Application-services and Reference Datasets (CARD), Letter of Invitation n° RES-POE/2007/525/LG/cb, ESA, 2008-2010, € 265.720, none.
- MEEO srl Italy (PI), Support by Pre-classification to Specific Applications (SPA), Letter of Invitation n° RES-POE/2008/497/EC/sp, ESA, 2009-2011, € 469.903, none.
- MEEO srl Italy (WP Leader), Spatial Observation Services and Infrastructure (SOSI), Letter of Invitation n° RES-POE/2008/488/LG/cb, ESA, 2009, € 29.996 / ..., Siemens Austria (PI).
- MEEO srl Italy (PI), Support to the RoKEO PECS project (SRoKEO), Letter of Invitation n° RES-POE/2008/292/cb, ESA, 2009-2011, € 79.704 / ..., Romanian Space Agency.
- MEEO srl Italy (PI), Image Information Mining - Time Series (IIM-TS), ESA, 2009, € 13.576 / ..., Sarmap SA.
- Baraldi Consultancy in Remote Sensing (WP leader), BIOdiversity Multi-Source Monitoring System: from Space TO Species (BIO-SOS), FP7-SPACE-2010-1, EU-EC, 2010-2012, € 360.000 /..., ISSIA-CNR (PI), Alterra, IRD, Uni. of Bari, ATREE, Planetek, ICETA, Univ. Of Aberystwyth, ASI, Uni. of Milano-Bicocca.
- University of Maryland, Department of Geographical sciences (PI), National Aeronautics and Space Administration (NASA) Land-Cover and Land-Use Change (LCLUC) Program /.../ University of Maryland, University of South Dakota.
- Univ. Salzburg, Z-GIS (PI), ASAP11 project call, AutoSentinel2/3 project (Knowledge-based pre-classification of Sentinel-2/3 images for operational product generation and content-based image retrieval), ID 848009, FFG, 2015-2016, € 125.580.
- Univ. Salzburg, Z-GIS (PI), ICT of the Future project call, SemEO project (Semantic enrichment of optical EO data to enhance spatio-temporal querying capabilities), FFG, 2016-2017, € 128.947.

Professional references

- Prof. Franco Prodi, ISAC-CNR, Via P. Gobetti 101, Bologna 10129, Italy. Phone: +39-051-6399561, Email: f.prodi@isac.cnr.it
- Prof. and Chair Christophere Justice, 2181A LeFrak Hall, Department of Geographical Sciences, University of Maryland, College Park, MD 20742, USA. Phone: +1-301-4051600, Email: cjustice@umd.edu
- Dr. Alessandro Annoni, Head of the Spatial Data Infrastructures Unit, EC Joint Research Center, Via Fermi, Ispra (Varese), Italy. Phone: +39-0332-786166, Email: alessandro.annoni@jrc.ec.europa.eu
- Prof. Paolo Pavan, Engineering Department, University of Modena and Reggio Emilia, Italy. Phone: +39-059-2056158, Email: paolo.pavan@unimore.it
- Prof. Francesco Giannino, Department of Agricultural Sciences, University of Naples "Federico II", Via Università 100; 80055 PORTICI (Napoli), Italy. Phone: +39-081-2539424, Email: giannino@unina.it
- Dr. Virginia Puzzolo, European Commission Research Executive Agency, Covent Garden Place Rogier, 16 1049 Brussels Belgium, Email: virginia.puzzolo@ec.europa.eu
- Prof. Stefan Lang, Head Integrated Spatial Analysis (ISA), Interfaculty Department of Geoinformatics - Z_GIS, University of Salzburg, Schillerstr. 30, Building 15, 3rd Floor, 5020 Salzburg, Austria. Tel: +43 (0) 662-80447562, Email: stefan.lang@sbg.ac.at
- Prof. Thomas Blaschke, Deputy Director of the Interfaculty Department of Geoinformatics - Z_GIS, Integrated Spatial Analysis (ISA), University of Salzburg, Schillerstr. 30, 5020 Salzburg, Austria. . Tel: +43 (0) 662-80447525, Email: Thomas.Blaschke@sbg.ac.at
- Prof. Dirk Tiede, Interfaculty Department of Geoinformatics - Z_GIS, Integrated Spatial Analysis (ISA), University of Salzburg, Schillerstr. 30, 5020 Salzburg, Austria. Tel: +43 (0) 662-80447565, Email: dirk.tiede@sbg.ac.at

Driving licence B

ADDITIONAL INFORMATION

Publications

List of awards for work and publications

- Sept. 2015. Winner of the T-Systems Big Data Challenge of the Copernicus Masters 2015, with the project and feasibility study titled: "Satellite Image Automatic Mapper™ (SIAM™)-Through-Time (SIAMT^2) for spaceborne/ airborne multi-spectral image time-sequence classification in operating mode and content-based image database retrieval" (Project ID 150688)". Final project title: D. Tiede, A. Baraldi, M. Sudmanns, M. Belgiu, and S. Lang, "ImageQuerying (IQ): Off-the-shelf Image Content Extraction & Querying Across Time and Space". Awards Ceremony on Oct. 20, 2015 at the Satellite Masters Conference, 20-22 Oct. 2015, German Federal Ministry of Transport and Digital Infrastructure, Invalidenstraße 444, 10115 Berlin, Germany.
- May 2015, IGARSS 2015, Milan, Italy, 27-31 July 2015. IEEE GRSS Data Fusion Contest, paper “Geospatial 2D AND 3D object-based classification and 3D reconstruction of ISO-containers depicted in a LiDAR dataset and aerial imagery of a harbor", ranked 2nd best.

List of selected publications or working papers

[55] **A. Baraldi**, M. L. Humber, D. Tiede and S. Lang, “GEO-CEOS stage 4 validation of the Satellite Image Automatic Mapper lightweight computer program for ESA Earth observation Level 2 product generation – Part 1: Theory”, Cogent Geoscience, vol. 4, 2018. DOI: 10.1080/23312041.2018.1467357.

[54] **A. Baraldi**, M. L. Humber, D. Tiede and S. Lang, “GEO-CEOS stage 4 validation of the Satellite Image Automatic Mapper lightweight computer program for ESA Earth observation Level 2 product generation – Part 2: Validation”, Cogent Geoscience, vol. 4, 2018. DOI: 10.1080/23312041.2018.1467254.

[53] M. Sudmanns, D. Tiede, S. Lang and **A. Baraldi**, “Semantic and syntactic interoperability in online processing of big Earth observation data”, Int. J. of Digital Earth, vol. 11, no. 1, pp. 95-112, 2018. DOI: 10.1080/17538947.2017.1332112.

[52] **A. Baraldi**, D. Tiede, M. Sudmanns, and S. Lang, “Systematic ESA EO Level 2 product generation as pre-condition to semantic content-based image retrieval and information/knowledge discovery in EO image databases,” 2017 Conf. on Big Data From Space, BiDS’17, Toulouse, France, 28-30 March, 2017.

[51] D. Tiede, **A. Baraldi**, M Sudmanns, M. Belgiu and S. Lang, "Architecture and prototypical implementation of a semantic querying system for big earth observation image bases," European Journal of Remote Sensing, vol. 50, no. 1, pp. 452-463, Aug. 2017. DOI: 10.1080/22797254.2017.1357432.

[50] M. Sudmanns, D. Tiede, S. Lang and **A. Baraldi,** "Semantic and syntactic interoperability in online processing of big Earth observation data", Int. J. of Digital Earth, 31 May 2017. DOI: 10.1080/17538947.2017.1332112.

[49] **Andrea Baraldi**, Michael Laurence Humber, Dirk Tiede, Stefan Lang, "Stage 4 validation of the Satellite Image Automatic Mapper lightweight computer program for Earth observation Level 2 product generation, Part 1 Theory," Subjects: Computer Vision and Pattern Recognition (cs.CV), arXiv:1701.01930. Date: 8 Jan. 2017. [Online] Available: https://arxiv.org/ftp/arxiv/papers/1701/1701.01930.pdf

[48] **Andrea Baraldi**, Michael Laurence Humber, Dirk Tiede, Stefan Lang, "Stage 4 validation of the Satellite Image Automatic Mapper lightweight computer program for Earth observation Level 2 product generation, Part 2 Validation," Subjects: Computer Vision and Pattern Recognition (cs.CV), arXiv:1701.01932. Date: 8 Jan. 2017. [Online] Available: https://arxiv.org/ftp/arxiv/papers/1701/1701.01932.pdf

[47] **Andrea Baraldi**, Dirk Tiede, Stefan Lang, "Automated Linear-Time Detection and Quality Assessment of Superpixels in Uncalibrated True- or False-Color RGB Images," Subjects: Computer Vision and Pattern Recognition (cs.CV), arXiv:1701.01940. Date: 8 Jan. 2017. [Online] Available: https://arxiv.org/ftp/arxiv/papers/1701/1701.01940.pdf

[46] **Andrea Baraldi**, , João V. B. Soares, "Multi-Objective Software Suite of Two-Dimensional Shape Descriptors for Object-Based Image Analysis," Subjects: Computer Vision and Pattern Recognition (cs.CV), arXiv:1701.01941. Date: 8 Jan. 2017. [Online] Available: https://arxiv.org/ftp/arxiv/papers/1701/1701.01941.pdf

[45] **Andrea Baraldi**, Francesca Despini, Sergio Teggi, "Multi-spectral Image Panchromatic Sharpening, Outcome and Process Quality Assessment Protocol," Subjects: Computer Vision and Pattern Recognition (cs.CV), arXiv:1701.01942. Date: 8 Jan. 2017. [Online] Available: https://arxiv.org/ftp/arxiv/papers/1701/1701.01942.pdf

[44] **A. Baraldi**, "Automatic Spatial Context-Sensitive Cloud/Cloud-Shadow Detection in Multi-Source Multi-Spectral Earth Observation Images – AutoCloud+," Invitation to tender ESA/AO/1-8373/15/I-NB – "VAE: Next Generation EO-based Information Services", 3 Nov. 2015. DOI: 10.13140/RG.2.2.34162.71363. Subjects: Computer Vision and Pattern Recognition (cs.CV), arXiv: 1701.04256. Date: 8 Jan. 2017. [Online] Available: https://arxiv.org/ftp/arxiv/papers/1701/1701.04256.pdf

[43] **A. Baraldi**, D. Tiede, M. Sudmanns, M. Belgiu, and S. Lang, "Automated near real-time Earth observation Level 2 product generation for semantic querying," GEOBIA 2016, 14-16 Sept. 2016, University of Twente Faculty of Geo-Information and Earth Observation (ITC), Enschede, The Netherlands.

[42] D. Tiede, **A. Baraldi**, M. Sudmanns, M. Belgiu, and S. Lang, "ImageQuerying – Automatic real-time information extraction and content-based image retrieval in big EO image databases," submitted (Oral presentation and poster session), Second joint Workshop of the EARSeL Special Interest Group on Land Use & Land Cover and the NASA LCLUC Program, Prague, Czech Republic, May 6-7, 2016.

[41] D. Tiede, **A. Baraldi**, M. Sudmanns, M. Belgiu, and S. Lang, "ImageQuerying (IQ) – Earth Observation Image Content Extraction & Querying across Time and Space," submitted (Oral presentation and poster session), ESA 2016 Conf. on Big Data From Space, BIDS '16, Santa Cruz de Tenerife, Spain, 15-17 March, 2016.

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ANNEXES

- BaraldiSignature.jpg

europass

Language passport

Andrea Baraldi

Mother tongue(s)	Foreign language(s)
Italian	English

English

Self-assessment of language skills

UNDERSTANDING		SPEAKING		WRITING
Listening	Reading	Spoken interaction	Spoken production	Writing
C2 Proficient user	C2 Proficient user	C2 Proficient user	C2 Proficient user	C2 Proficient user

Certificates and diplomas

Title	Awarding body	Date	Level*
High School Diploma	Rex Putnam High School, Milwaukie, OR (USA)	01/07/1981	C2

Linguistic and intercultural experience

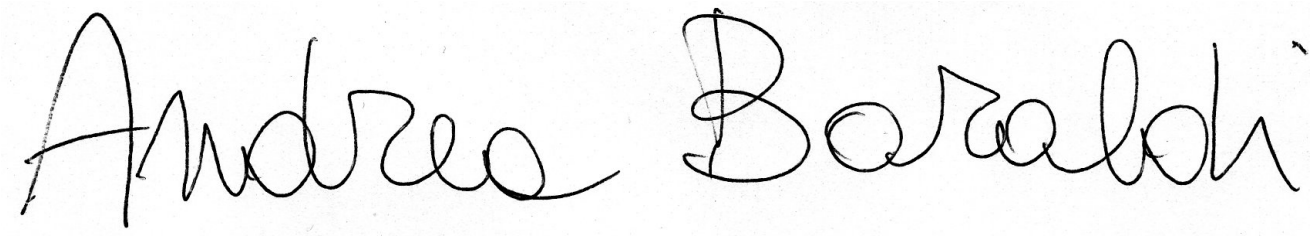
Description	Duration
Using languages at school and work: ▪ 1980-1981 AFS exchange student at Rex Putnam High School in Milwaukie, OR. ▪ 1997-1999. Post-doctoral researcher at the International Computer Science Institute (ICSI), Berkeley, CA (USA). ▪ 2010-2013. Research Associate Professor at the Univ. Maryland, College Park, MD.	–

Common European Framework of Reference for Languages - Self-assessment grid

		A1 Basic user	A2 Basic User	B1 Independent user	B2 Independent user	C1 Proficient user	C2 Proficient user
Understanding	Listening	I can understand familiar words and very basic phrases concerning myself, my family and immediate concrete surroundings when people speak slowly and clearly.	I can understand phrases and the highest frequency vocabulary related to areas of most immediate personal relevance (e.g. very basic personal and family information, shopping, local area, employment). I can catch the main point in short, clear, simple messages and announcements.	I can understand the main points of clear standard speech on familiar matters regularly encountered in work, school, leisure, etc. I can understand the main point of many radio or TV programmes on current affairs or topics of personal or professional interest when the delivery is relatively slow and clear.	I can understand extended speech and lectures and follow even complex lines of argument provided the topic is reasonably familiar. I can understand most TV news and current affairs programmes. I can understand the majority of films in standard dialect.	I can understand extended speech even when it is not clearly structured and when relationships are only implied and not signalled explicitly. I can understand television programmes and films without too much effort.	I have no difficulty in understanding any kind of spoken language, whether live or broadcast, even when delivered at fast native speed, provided I have some time to get familiar with the accent.
	Reading	I can understand familiar names, words and very simple sentences, for example on notices and posters or in catalogues.	I can read very short, simple texts. I can find specific, predictable information in simple everyday material such as advertisements, prospectuses, menus and timetables and I can understand short simple personal letters.	I can understand texts that consist mainly of high frequency everyday or job-related language. I can understand the description of events, feelings and wishes in personal letters.	I can read articles and reports concerned with contemporary problems in which the writers adopt particular attitudes or viewpoints. I can understand contemporary literary prose.	I can understand long and complex factual and literary texts, appreciating distinctions of style. I can understand specialised articles and longer technical instructions, even when they do not relate to my field.	I can read with ease virtually all forms of the written language, including abstract, structurally or linguistically complex texts such as manuals, specialised articles and literary works.
Speaking	Spoken interaction]	I can interact in a simple way provided the other person is prepared to repeat or rephrase things at a slower rate of speech and help me formulate what I'm trying to say. I can ask and answer simple questions in areas of immediate need or on very familiar topics.	I can communicate in simple and routine tasks requiring a simple and direct exchange of information on familiar topics and activities. I can handle very short social exchanges, even though I can't usually understand enough to keep the conversation going myself.	I can deal with most situations likely to arise whilst travelling in an area where the language is spoken. I can enter unprepared into conversation on topics that are familiar, of personal interest or pertinent to everyday life (e.g. family, hobbies, work, travel and current events).	I can interact with a degree of fluency and spontaneity that makes regular interaction with native speakers quite possible. I can take an active part in discussion in familiar contexts, accounting for and sustaining my views.	I can express myself fluently and spontaneously without much obvious searching for expressions. I can use language flexibly and effectively for social and professional purposes. I can formulate ideas and opinions with precision and relate my contribution skilfully to those of other speakers.	I can take part effortlessly in any conversation or discussion and have a good familiarity with idiomatic expressions and colloquialisms. I can express myself fluently and convey finer shades of meaning precisely. If I do have a problem I can backtrack and restructure around the difficulty so smoothly that other people are hardly aware of it.
	Spoken production	I can use simple phrases and sentences to describe where I live and people I know.	I can use a series of phrases and sentences to describe in simple terms my family and other people, living conditions, my educational background and my present or most recent job.	I can connect phrases in a simple way in order to describe experiences and events, my dreams, hopes and ambitions. I can briefly give reasons and explanations for opinions and plans. I can narrate a story or relate the plot of a book or film and describe my reactions.	I can present clear, detailed descriptions on a wide range of subjects related to my field of interest. I can explain a viewpoint on a topical issue giving the advantages and disadvantages of various options.	I can present clear, detailed descriptions of complex subjects integrating sub-themes, developing particular points and rounding off with an appropriate conclusion.	I can present a clear, smoothly-flowing description or argument in a style appropriate to the context and with an effective logical structure which helps the recipient to notice and remember significant points.
Writing	Writing	I can write a short, simple postcard, for example sending holiday greetings. I can fill in forms with personal details, for example entering my name, nationality and address on a hotel registration form.	I can write short, simple notes and messages. I can write a very simple personal letter, for example thanking someone for something.	I can write simple connected text on topics which are familiar or of personal interest. I can write personal letters describing experiences and impressions.	I can write clear, detailed text on a wide range of subjects related to my interests. I can write an essay or report, passing on information or giving reasons in support of or against a particular point of view. I can write letters highlighting the personal significance of events and experiences.	I can express myself in clear, well-structured text, expressing points of view at some length. I can write about complex subjects in a letter, an essay or a report, underlining what I consider to be the salient issues. I can select a style appropriate to the reader in mind.	I can write clear, smoothly-flowing text in an appropriate style. I can write complex letters, reports or articles which present a case with an effective logical structure which helps the recipient to notice and remember significant points. I can write summaries and reviews of professional or literary works.

Common European Framework of Reference for Languages (CEF): © Council of Europe

BaraldiSignature.jpg



arpae
agenzia prevenzione ambiente energia emilia-romagna

DICHIARAZIONE SOSTITUTIVA DI ATTO NOTORIO E DI CERTIFICAZIONE AI SENSI DEGLI ARTT. 46 E 47 DEL DPR n. 445/2000

PROCEDURA DI CONFERIMENTO DI INCARICO DI PRESTAZIONE D'OPERA INTELLETTUALE DI NATURA OCCASIONALE NELL'AMBITO DEL PROGETTO "18LET". ([1])

Il/la sottoscritto/a BARALDI ANDREA

sotto la propria responsabilità e consapevole di quanto disposto dall'art. 76 del DPR n. 445/2000 e dall'art. 495 del c.p. in caso di dichiarazioni mendaci,

DICHIARA

ai fini di quanto previsto dall'art. 1 c. 42 lett. h) della L. 190/2012

- che non è coniuge, convivente, né parente, nè affine fino al quarto grado compreso del soggetto conferente l'incarico in oggetto, del responsabile del procedimento in esame, nonchè del responsabile del progetto([2]);
- che non sussistono rapporti personali di debito/credito, rapporti personali di tipo economico, commerciale, professionale, finanziario con il soggetto conferente l'incarico in oggetto, con il responsabile del procedimento in esame, nonchè con il responsabile del progetto;
- che, per quanto di propria conoscenza, non presta attività a favore di soggetti sottoposti a procedure sanzionatorie da parte di Arpae o per le quali l'Agenzia svolge un ruolo istruttorio/autorizzatorio in procedimenti amministrativi;
- che non svolge attività in conflitto di interessi con le funzioni istituzionali di Arpae, avendo riguardo anche alle disposizioni di cui all'art. 7 del DPR n. 62/2013, applicabili per quanto compatibili con riferimento ai contenuti ed alla natura del contratto di lavoro autonomo in oggetto ([3]);
- che non sussiste alcuna delle condizioni di incompatibilità di cui all'art. 5 della Disciplina in materia di conferimento di incarichi di prestazione d'opera intellettuale, con contratti di lavoro autonomo presso Arpae Emilia-Romagna, approvata con DDG 130/2017.([4])
- che non è già lavoratore privato o pubblico collocato in quiescenza (art. 5 c. 9 del DL 95/2012 convertito nella L. 135/2012 e successive modifiche con L. 114/2014 e L. 124/2015).

---

1 La presente dichiarazione sarà pubblicata sul sito web istituzionale di Arpae, in caso di conferimento dell'incarico in esame al soggetto sottoscrivente.

2 Soggetto conferente l'incarico è la dott.ssa Tiziana Paccagnella; Responsabile del Procedimento è il dott. Lucio Botarelli; Responsabile di progetto è il dott. Lucio Botarelli.

3 Vedi Allegato 1) - art. 7 del DPR 62/2013.

4 Vedi Allegato 1) - estratto della Disciplina approvata con DDG 130/2017.

DICHIARA ALTRESI'

ai fini di quanto previsto dall'art. 15 c. 1 lett. c) del d. lgs. 33/2013

(barrare la casella)

☒ che non svolge incarichi e/o non ha la titolarità di cariche in enti di diritto privato regolati o finanziati dalla Pubblica Amministrazione e/o non svolge attività professionali;

☐ che svolge incarichi e/o ha la titolarità di cariche in enti di diritto privato regolati o finanziati dalla Pubblica Amministrazione e/o svolge attività professionali, e precisamente:
(riportare gli incarichi e/o le cariche in enti di diritto privato regolati o finanziati da PA e/o attività professionali)

- incarico/carica di: _____;
- a favore dell'ente: _____;
- attività professionale di: _____;
- a favore di: _____;

Modena lì 2 Agosto 2018

Andrea Baraldi
(Firma)

La presente istanza deve essere sottoscritta dall'interessato in presenza del dipendente addetto ovvero sottoscritta e presentata unitamente a copia fotostatica non autenticata di un documento di identità del sottoscrittore (art. 38 D.P.R. n. 445/2000).

Spazio riservato all'ufficio ricevente, da utilizzare in alternativa all'invio della copia fotostatica del documento di identità.

Certifico apposta, in mia presenza, la firma del dichiarante. Il dipendente addetto _____

PGSIM/2018/
Bologna,

Gent.mo
Ing. Andrea Baraldi

TP\ls

Oggetto: Contratto per prestazione occasionale

Con la presente Le assegniamo il presente incarico occasionale alle seguenti principali condizioni:

1. Oggetto

Forma oggetto del presente incarico l'attività di:

- analisi delle migliori pratiche e procedure per la generazione automatica di prodotti e servizi informativi operativi, in tempo reale e per fini molteplici, generabili da immagini di osservazione della Terra acquisite principalmente da sensori ottici satellitari.

Nell'espletamento dell'incarico che Le viene conferito, ferma restando la Sua piena autonomia, Ella terrà conto delle nostre indicazioni al fine di coordinare la Sua attività con i programmi stabiliti dall'Agenzia.
Le attività oggetto del presente incarico dovranno essere espletate nel rispetto delle disposizioni di cui al DPR n. 62/2013 (Codice di comportamento dei dipendenti pubblici) e delle disposizioni di cui al Codice di comportamento aziendale di Arpae Emilia-Romagna, applicabili per quanto compatibili con il presente contratto di lavoro autonomo.

2. Impegno personale

Per lo svolgimento di quanto indicato al punto 1., Lei assicurerà un puntuale e corretto espletamento delle attività previste, senza alcun vincolo di orario.

3. Durata

Le attività di cui al punto1) saranno espletate entro il 31/12/2018.

4. Condizioni economiche

Per lo svolgimento delle attività di cui al punto 1. Le verrà riconosciuto un compenso forfetario lordo di **euro 4.900,00,** comprensivo di tutte le spese relative allo svolgimento del presente incarico occasionale, che viene da Lei accettato senza riserva alcuna.

Prendiamo atto della Sua dichiarazione, sotto la Sua unica responsabilità, che le prestazioni oggetto del nostro accordo sono di natura occasionale e sono quindi escluse dal campo di applicazione dell'I.V.A.

5. Pagamenti

L'importo a Lei dovuto sarà assoggettato a ritenuta d'acconto obbligatoria pari al 20% (venti percento), che verrà operata, al pagamento, sul valore lordo totale per il quale ci verrà rilasciata la ricevuta (notula) in cui dovrà essere riportato il numero dell'atto di conferimento dell'incarico di natura occasionale in oggetto.

Tale ricevuta, completa di bollo se dovuto, dovrà essere intestata a:

Arpae Emilia-Romagna, sede legale Via Po, 5 – 40139 Bologna. C.F. e P.IVA: 04290860370

La ricevuta dovrà essere trasmessa esclusivamente a mezzo posta elettronica al seguente indirizzo pec: **workflow_amm@cert.arpa.emr.it**

Arpae provvederà ai pagamenti entro 30 giorni dalla data di ricevimento della ricevuta.

Lei si impegna a comunicare ad Arpae eventuali modifiche al Suo regime fiscale che dovessero intercorrere tra il momento dell'emissione della ricevuta (notula) e il momento della liquidazione della stessa da parte della scrivente Amministrazione.

Lei si impegna, altresì, a comunicare ad Arpae, prima della corresponsione del compenso pattuito, l'eventuale superamento del limite di esenzione dalla contribuzione INPS, pari a 5.000,00 euro lordi annui (anno solare).

6. Recesso

L'eventuale rinuncia all'incarico da parte Sua o l'eventuale revoca da parte nostra dell'incarico conferitoLe dovrà essere notificata, da una parte all'altra, con un preavviso di almeno 7 giorni.

Le verrà compensata comunque solo l'attività da Lei effettivamente svolta fino a quel momento.

In caso di violazione delle disposizioni di cui al DPR n. 62/2013 (Codice di comportamento dei dipendenti pubblici) e/o delle disposizioni di cui al Codice di comportamento aziendale di Arpae Emilia-Romagna, applicabili - per quanto compatibili - alla prestazione oggetto del presente incarico, si prevede la possibilità per Arpae di risolvere anticipatamente il presente contratto di prestazione occasionale, nel rispetto dei principi di gradualità e proporzionalità.

7. Impegno di riservatezza

Lei è tenuto/a al più assoluto riserbo sui dati e sulle informazioni di cui venisse a conoscenza durante l'esecuzione dell'attività di cui all'oggetto.

E' vietata la riproduzione di qualsiasi documento.

Lei si impegna, inoltre, a mantenere riservate e a non divulgare a terzi tutte le informazioni trasmesseLe nell'ambito del presente incarico.

8) Trattamento dei dati personali

Arpae in relazione alla raccolta dei dati personali del collaboratore, effettuata in occasione della sottoscrizione del presente contratto, si impegna a rispettare quanto previsto dal D. Lgs. n.

196/2003. Si allega al presente contratto l'informativa prevista dall'art. 13 del sopra citato Decreto Legislativo.

9) Controversie

Per qualunque controversia dovesse insorgere nell'interpretazione e nell'esecuzione del presente contratto il foro esclusivamente competente è quello di Bologna.

10) Clausole finali

Il presente contratto formalizza la totalità degli accordi tra le parti. Qualsiasi modificazione o correzione dovrà essere preventivamente concordata per iscritto.

La prestazione richiesta, sia per le sue specifiche caratteristiche (nessun vincolo gerarchico, nessuna predisposizione di direttive attinenti l'intrinseco svolgimento dell'attività, nessun obbligo di orario di lavoro), sia perché così voluto e dichiarato dalle parti, non comporta alcun rapporto di lavoro subordinato.

L'Ente resta sollevato da ogni e qualsiasi responsabilità derivante dall'espletamento dell'incarico.

Il presente contratto è soggetto a registrazione in caso d'uso a cura e spese della parte richiedente.

In ottemperanza a quanto previsto dall'art. 17 del DPR n. 62/2013, si allega al presente contratto copia dello stesso DPR n. 62/2013 (Codice di comportamento dei dipendenti pubblici). Si allega, altresì, al presente contratto, il Codice di comportamento aziendale di Arpae Emilia-Romagna, in ottemperanza a quanto previsto dall'art. 14 c. 6 dello stesso Codice. I suddetti documenti sono consultabili anche sul sito web di Arpae, nella Sezione "Amministrazione Trasparente", sottosezione "Disposizioni Generali- Atti Generali".

L'incaricato è, altresì, informato che sul sito web di Arpae, nella Sezione "Amministrazione Trasparente", sottosezione "Anticorruzione", è pubblicato il *Piano triennale per la prevenzione della Corruzione*.

Nel formularLe i migliori auguri di una proficua collaborazione La preghiamo, ove d'accordo con il contenuto del contratto, di restituire all'Ente copia della presente da Lei sottoscritta, pagina per pagina, per integrale accettazione e conferma del contenuto del contratto medesimo, nonché dei relativi allegati.

Distinti saluti.

IL DIRETTORE
Servizio Idro-Meteo-Clima
Arpae Emilia-Romagna
- Dott.ssa Tiziana Paccagnella –

Allegati:

1) Informativa sulla privacy ex art. 13 D.lgs. 196/2003;

2) DPR n. 62/2013 (Codice di comportamento dei dipendenti pubblici), reperibile al seguente link: https://www.arpae.it/cms3/documenti/_cerca_doc/amministrativi/Codice_comportamento_DPR62_2013.pdf ;

3) Codice di Comportamento aziendale di Arpae Emilia-Romagna, reperibile al seguente link: https://www.arpae.it/cms3/documenti/_cerca_doc/trasparenza/personale/Codice_aziendale_2017_pubblicato.pdf .

Per accettazione

Il professionista
Ing. Andrea Baraldi

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Ai sensi dell'art. 1341 e 1342 C.C. si intendono specificatamente approvate le disposizioni contenute negli artt.:

6. Recesso
7. Impegno di riservatezza
8. Trattamento dei dati personali
9. Controversie
10. Clausole finali

Per accettazione

Il professionista
Ing. Andrea Baraldi

.....

Informativa sul trattamento dei dati personali ai sensi del Regolamento (UE) 2016/679 (RGPD)

Arpae Emilia-Romagna, in qualità di titolare del trattamento dei dati personali (con sede in Via Po 5, 40139 Bologna, dirgen@cert.arpa.emr.it - Centralino 051- 6223811), tratterà i dati personali conferiti con modalità prevalentemente informatiche e telematiche, per le finalità previste dal Regolamento (UE) 2016/679 (RGPD), in particolare per l'esecuzione dei propri compiti di interesse pubblico o comunque connessi all'esercizio dei propri pubblici poteri, ivi incluse le finalità di archiviazione, di ricerca storica e di analisi per scopi statistici.

I dati saranno trattati per tutto il tempo di durata del procedimento amministrativo o della attività tecnica di Arpae che la riguarda e successivamente saranno mantenuti in conformità alle norme sulla conservazione della documentazione amministrativa.

I dati saranno trattati esclusivamente dal personale e da collaboratori di Arpae Emilia-Romagna o dalle imprese espressamente nominate come responsabili esterni del trattamento. Al di fuori di queste ipotesi i dati non saranno comunicati a terzi né diffusi, se non nei casi specificamente consentiti dall'interessato o previsti dal diritto nazionale o dell'Unione Europea.

Gli interessati hanno il diritto di chiedere al titolare del trattamento l'accesso ai propri dati personali, la rettifica o la cancellazione degli stessi, la limitazione del trattamento che li riguarda o di opporsi al trattamento (artt. 15 e ss. del RGPD). L'apposita istanza ad Arpae è presentata contattando il DPO (Responsabile della Protezione dei Dati) all'indirizzo dpo@arpae.it presso Arpae.

Gli interessati, ricorrendone i presupposti, hanno, altresì, il diritto di proporre reclamo secondo le procedure previste dagli artt. 77 e ss. del RGPD.

N. Proposta: PDTD-2018-772 del 27/09/2018

Centro di Responsabilità: Servizio Idro-Meteo-Clima

OGGETTO: Servizio Idro Meteo Clima. Conferimento incarico di prestazione d'opera intellettuale di natura occasionale all'ing. Andrea Baraldi.

PARERE CONTABILE

Il/La sottoscritto/a Dott/Dott.ssa Ranieri Daniela, Responsabile Amministrativo/a di Servizio Idro-Meteo-Clima, esprime parere di regolarità contabile ai sensi del Regolamento Arpae sul Decentramento amministrativo.

Data 01/10/2018

Il/La Responsabile Amministrativo/a

europass Curriculum vitae

PERSONAL INFORMATION

Andrea Baraldi

Sex | Date of birth | Nationality

POSITION

Senior Researcher, Ph.D.

WORK EXPERIENCE

16/02/2018–Present

Senior scientist

Agenzia Spaziale Italiana (Italian Space Agency, ASI)
Via del Politecnico, 00133 Rome (Italy)
www.asi.it

- Assigned to the Technical Scientific Coordination (Coordinamento Tecnico Scientifico, COT) unit, Space Science Data Center (SSDC) group, sub-domain Earth Observation (EO).
- Responsible of contributing to the development of EO sensory data-derived value-added information products and processes, defined at the levels of abstraction of: (i) information processing system requirements specification, (ii) information/knowledge representation, (iii) system design (architecture), (iv) algorithm, (v) implementation, (vi) integration and (vi) quality assessment for testing and validation purposes, based on a minimally dependent and maximally informative (mDMI) set of outcome and process quantitative quality indicators (OP-Q2Is), selected in compliance with the FAIR criteria (Findable, Accessible, Interoperable, Reusable) to guarantee interoperability with national and international EO data and information access platforms, if any.

01/10/2016–30/10/2017

Senior scientist

Department of Geoinformatics – Z_GIS, University of Salzburg, Salzburg (Austria)

Funded project: Austrian Research Promotion Agency (FFG), project call "Proposals to ICT of the Future", project title: SemEO (Semantic enrichment of optical EO data to enhance spatio-temporal querying capabilities).

2-of-12 months overlapping with the 18-month PhD 2nd/3rd-year training period abroad, University of Naples Federico II, Department of Agricultural Sciences, Naples, Italy.

As follow-up of the funded FFG AutoSentinel-2/3 project (2015), the SemEO project aims at further developing the Earth Observation (EO) Image Understanding For Semantic Querying (EO-IU4SQ) system prototype, capable of automated near real-time generation of ESA EO Level 2 product from each single-date EO multi-spectral (MS) image stored in multi-source EO big image databases as necessary not sufficient pre-condition for semantic querying the database. Output products generated by the closed-loop EO-IU4SQ system monotonically increase their value-added with closed-loop iterations. An ESA EO Level 2 product is defined as a MS image corrected for geometric, atmospheric, adjacency and topographic effects, stacked with its data-derived scene classification map (SCM) whose land cover (LC) class legend is general-purpose, user- and application-independent and includes quality layers such as cloud and cloud-shadow. No ESA Level 2 product has ever been systematically generated at the ground segment to date. No semantic content-based image retrieval (SCBIR) system has ever been developed in operating mode by the remote sensing community either. Our working hypothesis was that existing content-based image retrieval (CBIR) systems support no semantic querying because they lack EO image understanding capabilities, required to transform EO sensory data into EO value-adding information products of symbolic quality. Our automated near- real-time ESA EO Level 2 product generator is input with multi-spectral (MS), super-spectral-spectral (SS) and hyper-spectral (HS) spaceborne images provided with radiometric calibration metadata, such as those acquired by Sentinel-2 MSI, Sentinel-3 OLCI and SLSTR, ENVISAT AATSR, ERS-2 ATSR-2, MSG, Landsat-4/5/7 TM, Landsat-8 OLI, ASTER, MODIS, SPOT-4/5/6/7, Pleiades-1A/B, DMC, FORMOSAT, RapidEye, IKONOS, QuickBird, WorldView-2/3/4, APEX,

AVIRIS, Hyperion, etc. For comparison purposes in terms of scalability to changes in sensor specifications, the Sentinel 2 Correction (Sen2Cor) Prototype Processor developed by ESA in collaboration with Telespazio VEGA, to be run on user side, is input with Sentinel-2 MSI imagery exclusively.

01/03/2016–01/07/2016

Visiting scientist

Computer Vision Center (CVC), Universidad Autonoma de Barcelona (UAB), Barcelona (Spain)

5 months overlapping with the 18-month PhD 2nd/3rd-year training period abroad, University of Naples Federico II, Department of Agricultural Sciences, Naples, Italy.

Objective: Survey of the state-of-the-art in deep convolutional neural network (DCNN) design and implementation issues, with special emphasis on autonomous driving vehicle control system applications. My interest in this application field of computer vision dates back to Jan. 2015, when I presented at Vision Lab (VisLab) srl, spinoff of the University of Parma, Italy, a critical analysis of existing publications co-authored by Prof. Alberto Broggi. General Manager at VisLab srl (acquired by Silicon-Valley company Ambarella Inc. on June 2015) and a professor of Computer Engineering at the University of Parma in Italy, Prof. Alberto Broggi has been pioneering the field of machine vision applied to driverless cars and unmanned vehicles in general. At CVC-UAB, I searched for further developments in DCNN design and implementation, such as: integration of inductive learning-from-data filter parameter selection with physical model-based wavelet filter banks consistent with pre-attentive visual perception (e.g., Mach band illusion in ramp-edge detection), foveated imaging where spatial filter resolution is eccentricity-dependent in combination with focus-of-visual-attention mechanisms for fixation point selection based on hybrid (deductive/top-down and inductive/bottom-up) inference.

01/07/2013–31/01/2016

Senior scientist

Department of Geoinformatics – Z_GIS, University of Salzburg, Salzburg (Austria)

- FP7-Space project G-SEXTANT (Consolidation of a standardized portfolio of Earth Observation products and pre-operational services in the frame of pre-defined scenarios), Role: Project collaborator.
- Austrian Research Promotion Agency (FFG) - Project call ASAP11, project title: AutoSentinel2/3 (Knowledge-based pre-classification of Sentinel-2/3 images for operational product generation and content-based image retrieval). Role: Co-leader.
  - The AutoSentinel2/3 project started the research & technological development of an innovative Earth Observation (EO) Image Understanding For Semantic Querying (EO-IU4SQ) system prototype, capable of automated near real-time generation of ESA EO Level 2 product from each single-date multi-spectral (MS) Sentinel-2 MSI and Sentinel-3 OLCI and SLSTR image stored in multi-source EO big image databases as necessary not sufficient pre-condition for semantic querying the database. No ESA Level 2 product has ever been systematically generated at the ground segment to date. No semantic content-based image retrieval (SCBIR) system has ever been developed in operating mode by the remote sensing community either. Also refer to the FFG follow-up project SemEO.
- 10 months overlapping with the 18-month PhD 2nd/3rd-year training period abroad, University of Naples Federico II, Department of Agricultural Sciences, Naples, Italy.

01/07/2013–01/07/2015

Adjunct Associate Professor

Dept. of Geographical Sciences, Univ. of Maryland, College Park (USA)

Co-supervision of one PhD student

01/02/2015–31/03/2015

PhD Fellowship

Ben Gurion University of the Negev, Sde Boker (Israel)

Fp7-Experimentationin Ecosystem Research (ExpeER) project. Title of the ExpeER project proposal: Prior Spectral Knowledge for Ecosystem Service Monitoring and Understanding (PriorSpecK4ECOS).

1 month overlapping with the 18-month PhD 2nd/3rd-year training period abroad, University of Naples Federico II, Department of Agricultural Sciences, Naples, Italy.

Objective: biophysical variable estimation, e.g., leaf area index and crop water requirement estimation, from spaceborne/airborne multi-spectral and hyper-spectral imagery.

01/02/2014–28/02/2014

Senior Scientist Fellowship

German Aerospace Center (DLR), Institute of Remote Sensing Technology, Oberpfaffenhofen (Germany)

German Academic Exchange Service (DAAD), Senior Scientist Fellowship titled: Advances in spaceborne image automatic near real-time pre-classification and segmentation

01/09/2010–30/06/2013

Research Associate Professor

Dept. of Geographical Sciences, Univ. of Maryland, College Park (USA)

NASA Land-Cover and Land-Use Change (LCLUC) Program, Automatic pre-classification and segmentation of the Landsat Web-Enabled Data set (WELD) at continental and global spatial extents

- Development of the Satellite Image Automatic Mapper (SIAM), a lightweight computer program eligible for use in mobile software applications and capable of automated near real-time hyperpolyhedralization of a multi-spectral (MS) reflectance space into MS color names, superpixel detection and vector quantization quality assessment in the image-domain (please, refer to my personal web page: siam.andreabaraldi.com). SIAM can be input with any MS, super-spectral (SS) or hyper-spectral image (HS) acquired by past, present or future imaging sensor radiometrically calibrated into top-of-atmosphere reflectance (TOARF) or surface reflectance (SURF) values. Hence, SIAM can map into MS color names automatically and in near real-time any spaceborne optical image acquired by MS, SS, or HS imaging sensors such as Sentinel-2 MSI, Sentinel-3 OLCI and SLSTR, ENVISAT AATSR, ERS-2 ATSR-2, MSG, Landsat-4/5/7 TM, Landsat-8 OLI, ASTER, MODIS, SPOT-4/5/6/7, Pleiades-1A/B, DMC, FORMOSAT, RapidEye, IKONOS, QuickBird, WorldView-2/3/4, APEX, AVIRIS, Hyperion, etc.
- Large-scale burned area product generation from Landsat image time-series, where SIAM provides automated near real-time single-date superpixel detection and color naming employed as input to a spatial context-sensitive decision tree for burned area classification through time.
- SIAM Stage 4 Validation by independent means at continental scale on an annual Web-Enabled Landsat data (WELD) image composite time series, in agreement with the Group on Earth Observations (GEO) Quality Assurance Framework for Earth Observation (QA4EO) calibration/validation (Cal/Val) requirements.

01/03/2009–30/11/2009

Scientific consultant

SARMAP, Purasca (Switzerland)

Development of the OpticalScape commercial software toolbox (never released)

01/02/2005–01/02/2009

Scientific officer

European Commission Joint Research Centre (EC-JRC), Ispra (VA) (Italy)

Affiliated to the Spatial Data Infrastructures (SDI) unit of the Institute for Environment and Sustainability (IES). Development of operational remote sensing image understanding systems for vegetation monitoring, cloud detection, flood detection, fire detection, urban area monitoring at either local (regional), continental or global scale.

01/08/2003–31/10/2004

Research associate

Institute of Intelligent Systems for Automation (ISSIA)-National Research Council (CNR), Bari (Italy)

FP6-LEWIS (Landslide Early-Warning Integrated System). Research and development in computer vision, pattern recognition and remote sensing image understanding.

01/06/2002–01/06/2003

Research associate

Institute of Intelligent Systems for Automation (ISSIA)-National Research Council (CNR),

Bari (Italy)

Research and development of context-sensitive neuro-fuzzy clustering algorithms for multi-source image analysis

01/05/2000–01/05/2002 **Post-doctoral researcher**

European Commission Joint Research Centre (EC-JRC), Ispra (VA) (Italy)

Affiliated to the Global Vegetation Monitoring (GVM) unit of the Institute for Environment and Sustainability (IES). Title of the research activity: "Development and validation of algorithms for the automatic thematic information extraction from wide area radar maps of forest ecosystems."

01/06/1999–01/04/2000 **Research associate**

Istituto di Scienze dell'Atmosfera e del Clima (ISAC)-National Research Council (CNR), Bologna (Italy)

Machine learning and computer vision applications to remote sensing images.

01/12/1997–01/06/1999 **Post-doctoral researcher**

International Computer Science Institute (ICSI), Berkeley (USA)

Affiliated to the Artificial Intelligence group led by Prof. J. Feldman, ICSI and UC Berkeley. Title of the research activity: "Scatter-partitioning neural networks for image segmentation."

01/03/1993–30/11/1997 **Research associate**

Istituto per lo studio delle Metodologie Geofisiche Ambientali (IMGA)-National Research Council (CNR), Modena (Italy)

Main research interests: low-level visual processing, with special regard to texture analysis, and neural network applications to unsupervised data quantization and unsupervised data clustering.

01/01/1991–31/03/1993 **Consultant**

European Space Agency (ESA)-ESRIN, Frascati (Italy)

Responsible of the quality assessment of commercial geographic information systems (GISs) and of the development of raster modules in vector-based GISs (e.g., System9).

01/06/1989–30/12/1990 **Military service: Lieutenant in the Technical Corp**

Istituto Geografico Militare, Firenze (Italy)

Responsible for the development of satellite image segmentation and classification algorithms to be integrated with GIS (MicroStation by Intergraph).

01/02/1989–26/05/1989 **Consultant**

CIOC-National Research Council (CNR), Bologna (Italy)

Responsible for the development of object-oriented geographic information representation models and for the assessment of Geographic Information Systems (MicroStation by Intergraph).

EDUCATION AND TRAINING

01/03/2014–28/02/2017 **PhD in Agriculture and Agribusiness**

University of Naples “Federico II”, Department of Agricultural Sciences, Naples (Italy)

PhD dissertation (defense held on 16/05/2017): Pre-processing, classification and semantic querying of large-scale Earth observation spaceborne/airborne/terrestrial image databases: Process and product innovations

- Image pre-processing

- Self-organizing color constancy applied to uncalibrated panchromatic and color images, such as those acquired by consumer-level cameras mounted in mobile devices, such as smartphones and tablets, and those dealt with by unmanned aerial vehicles (UAVs), e.g., in precision agriculture applications, and by autonomous driving vehicle control systems.
- Absolute radiometric calibration of digital numbers (DNs) into top-of-atmosphere reflectance (TOARF) values.
- Automated near real-time ESA EO Level 2 product generation where a multi-spectral (MS) image is radiometrically calibrated from TOARF into surface reflectance (SURF) values corrected for atmospheric, topographic and adjacency effects.

- Near-orthogonal image analysis (decomposition) and near lossless image synthesis (reconstruction) based on an original wavelet-based spatial filter bank of even-symmetric filters and Gaussian filters.
- Visual feature extraction, raw primal sketch in pre-attentive vision.
  - Color naming in radiometrically calibrated MS imagery. Satellite Image Automatic Mapper (SIAM): lightweight computer program eligible for use in mobile software applications and capable of automated near real-time MS reflectance space hyperpolyhedralization into a dictionary of MS color names, superpixel detection and vector quantization quality assessment in the image-domain.
  - Color naming in radiometrically uncalibrated RGB imagery, either true- or false-color, such as those acquired by consumer-level cameras mounted in mobile devices, such as smartphones and tablets, and those dealt with by UAVs, e.g., in precision agriculture applications, and by autonomous driving vehicle control systems. Color naming in radiometrically uncalibrated RGB imagery must be employed in series to a color constancy image-pre-processing. RGB Image Automatic Mapper (RGBIAM): lightweight computer program eligible for use in mobile software applications and capable of automated near real-time RGB data cube polyhedralization into a dictionary of RGB color names, superpixel detection and vector quantization quality assessment in the image-domain.
  - Well-posed (deterministic) two-pass connected-component multi-level image labeling algorithm in operating mode (including small run-time memory occupation).
  - Original automated near real-time post-classification change/no-change detection in MS image time-series: SIAM-based change/no-change detection of MS color names through time.
  - Image contour detection. Original automated multi-scale wavelet-based zero-crossing image-contour detection in either panchromatic or color images, consistent with human visual perception (e.g., Mach bands illusion).
  - Image segmentation. Original automated multi-scale wavelet-based zero-crossing image-segment detection in either panchromatic or color images, consistent with human visual perception (e.g., Mach bands illusion).
  - Keypoint detection. Original automated multi-scale wavelet-based keypoint detection (simulating end-stopped cells in human vision): end-point, corner, T-junction, X-junction.
  - Local shape descriptors. Original minimally dependent and maximally informative set of planar shape descriptors: scale-invariant roundness, elongatedness, straightness of boundaries, simple connectivity, rectangularity and convexity.
- Visual feature extraction, full primal sketch in pre-attentive vision.
  - Texture segmentation (perceptual spatial grouping of texels). Original automated multi-scale binary texture profile generation.
- Attentive vision (classification).
  - Automated near real-time ESA EO Level 2 product generation where a multi-spectral (MS) image, radiometrically calibrated from TOARF into surface reflectance (SURF) values for atmospheric, topographic and adjacency effects, is stacked with its scene classification map (SCM). The general-purpose, application- and user-independent SCM legend is implemented as the FAO Land Cover Classification System (LCCS) taxonomy at the 3-level 8-class Dichotomous Phase (DP), augmented with quality layers such as cloud and cloud-shadow.
  - High-level hybrid feedback modular system for convergence-of-visual-evidence, where visual information primitives are: color names, texture, local shape, inter-object spatial topological (e.g., adjacency, inclusion, etc.) and spatial non-topological (e.g., distance measure, angle measure)

relationships .

- Modeled world (world ontology, world model, mental world): conceptual Entity-Relationship (ER) model, graphically represented as a semantic network with entities as nodes and relationships as arcs between nodes, provided with an algebra for spatiotemporal ER and event modeling.
- Incremental learning in a closed-loop hybrid (combined deductive and inductive) inference system architecture. Research & development of the Earth Observation (EO) Image Understanding For Semantic Querying (EO-IU4SQ) system prototype, capable of automated near real-time generation of ESA EO Level 2 product from each single-date EO multi-spectral (MS) image stored in multi-source EO big image databases as necessary not sufficient pre-condition for semantic querying the database. Output products generated by the closed-loop EO-IU4SQ system monotonically increase their value-added with closed-loop iterations.

- Automated stratified (layered, masked, driven-by-prior-knowledge) estimation of biophysical canopy variables from EO optical imagery. (i) Automated stratified multivariate estimation of a leaf area index (LAI), alternative to the Clevers reflectance model for LAI estimation (CLAIR), whose input is a univariate Weighted Difference Vegetation Index (WDVI). (ii) Automated stratified multivariate estimation of crop water requirements, alternative to: (a) the empirical crop coefficient (Kc)-normalized difference vegetation index (NDVI) relationship for canopy evapotranspiration estimation in comparison with evapotranspiration of a reference canopy, and (b) the FAO-56 procedure for the semi-empirical estimation of canopy evapotranspiration from meteorological data and crop variables, such as LAI and surface albedo, estimated from EO data.
- Original perceptual visual quality metric (PVQM) between a test and a reference image-pair, consistent with human visual perception, e.g., consistent with the Mach bands illusion in ramp-edge detection.
- Outcome and process quantitative quality assessment.
  - SIAM Stage 4 Validation by independent means at continental scale on an annual Web-Enabled Landsat data (WELD) image composite time series, in agreement with the Group on Earth Observations (GEO) Quality Assurance Framework for Earth Observation (QA4EO) calibration/validation (Cal/Val) requirements.
  - Sentinel-2 10 m resolution ESA EO Level 2 product Stage 2 Validation in comparison with the European Environment Agency GIO Land High Resolution Layers (HRLs), 20 m resolution. National scale: Austria.
  - Cloud/cloud-shadow accuracy assessment in comparison with the GaoFen-1 image and reference dataset available online (http://sendimage.whu.edu.cn/en/mfc/).

01/06/1993–14/06/1994

1st Level Master in Software Engineering

University of Padoa and Purdue University, West Lafayette, Indiana, USA, Padova (Italy)

01/09/1982–01/02/1989

Laurea (MS) degree in Electronic Engineering

University of Bologna, Bologna (Italy)

Title of the Laurea thesis: Segmentation and classification of high resolution satellite images

PERSONAL SKILLS

Mother tongue(s): Italian

Foreign language(s)

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C2	C2	C2	C2
High School Diploma					

Levels: A1 and A2: Basic user - B1 and B2: Independent user - C1 and C2: Proficient user
Common European Framework of Reference for Languages

Communication skills

Experienced at working in a European and multicultural dimension. Excellent adaptability to new situations and environments. Excellent communication and writing skills.

Organisational / managerial skills

Extensive experience of participating in research projects, managing human resources and teaching.

Job-related skills

- Teaching and leadership capabilities.
- Scientific domains of expertise.
  - Software engineering.
  - Cognitive science. Cognitive science is the interdisciplinary scientific study of the mind and its processes. Mental faculties of concern to cognitive scientists include perception, language, memory, attention, reasoning, and emotion. Cognition is synonym of (biological) intelligence, learning, adaptation, self-organization. Multi-disciplinary cognitive science encompasses linguistics, philosophy, anthropology, neuroscience, psychophysics, artificial intelligence and machine learning. According to cybernetics an "artificial mind" (software) cannot be pursued independently of an "electronic brain" as its physical support (hardware). This "connectionist approach" is alternative to the "symbolic approach" promoted by traditional artificial intelligence where an artificial mind is investigated independently of its physical support.
  - Machine learning-from-data.
    - Supervised (labeled) data learning for classification and function regression, e.g., deep convolutional neural networks (DCNNs).
    - Unsupervised (unlabeled) data learning for density function estimation, vector quantization and unsupervised data clustering, including self-organizing topology preserving neural networks (TPNN) capable of: (i) generating/removing processing units dynamically and (ii) generating/removing lateral connections dynamically.
  - Artificial intelligence. Top-down (deductive) prior knowledge transfer from human-to-machine, typical of artificial intelligence, is required as initial condition by inherently ill-posed inductive data learning algorithms, typically investigated by machine learning, to become better conditioned for numerical solution. To take advantage of the unique features of each and overcome their shortcomings, top-down/deductive learning-by-rule subsystems (equivalent to genotype) and bottom-up/inductive learning-from-examples subsystems (equivalent to phenotype) are typically combined into hybrid inference systems.
    - Conceptual Entity-Relationship knowledge/information representation combined with state diagrams (finite state automata) to provide a mental model of the 4D spatiotemporal physical world, known as world model or geospatiotemporal ontology. Noteworthy, processes are nodes in flow charts corresponding to edges in state diagrams. In a semantic network, entities are nodes and relationships are arcs between nodes. A space-time world model consists of: (1) continuants, subdivided into (a) geo-objects (geospatial categorical variables provided with semantics), (b) geo-fields (geospatial numeric variables) and (c) field-objects (categorical variables as discretized geo-fields). (2) Occurrents, which means events/(end of) processes. An event is a change in state of a continuant. A continuant in the space-time real-world domain is described by attributes: (i) space (x, y, z), (ii) time t, (iii) numeric and categorical variables, e.g., appearance properties, and (iv) a (symbolic) theme, belonging to a finite and discrete vocabulary (codebook) of codewords in a geospatial ontology. A phenomenon is any ensemble of states and/or changes in state of one or more continuants observed in time while space or theme are either controlled or fixed.
    - Expert system design and development: fact base, knowledge base (first-principle models, rules and metarules), inference engine (provided with four types of logical reasoning: deduction, abduction, induction and transitivity), system requirements specification in user-speak by domain experts, statement of external functionalities in techno-speak by knowledge engineers.
  - Pattern (e.g., spectral signature) recognition, including (2D) planar shape descriptors.
  - Multiple source data fusion, e.g., optical and synthetic aperture radar (SAR) imagery fused at semi-symbolic or symbolic levels of abstraction, rather than at the sub-symbolic level of sensory data (observables).
  - Computer vision (computer-driven scene-from-image reconstruction and understanding) consistent with human visual perception (e.g., Mach bands illusion).

- Image pre-processing (enhancement) and feature extraction consistent with human vision, e.g., color constancy, color naming.
- Primary visual cortex mechanisms at the raw primal sketch (e.g., wavelet filter banks of even- and odd-symmetric spatial filters for zero-crossing image-contour detection, end-stopped cells for keypoint detection, automatic zero-crossing segment detection from zero-crossing image-contours) and full primal sketch (texture segmentation as perceptual spatial grouping of texels).
- Attentional vision, e.g., foveated imaging system in combination with a hybrid (combined deductive and inductive) focus-of-attention mechanism.

- Remote sensing.
  - Systematic ESA Level 2 product generation at the ground segment, encompassing a single-date multi-spectral (MS) image radiometrically calibrated into surface reflectance values corrected for atmospheric, topographic and adjacency effects, stacked with its general-purpose, user- and application-independent scene classification map (SCM).
  - Satellite Image Automatic Mapper (SIAM): proprietary lightweight computer program eligible for use in mobile software applications and capable of automated near real-time hyperpolyhedralization of a multi-spectral (MS) reflectance space into MS color names, superpixel detection and vector quantization quality assessment in the image-domain.
  - RGB Image Automatic Mapper (RGBIAM): proprietary lightweight computer program eligible for use in mobile software applications and capable of automated near real-time polyhedralization of an RGB cube into RGB color names, superpixel detection and vector quantization quality assessment in the image-domain
  - Self-organizing color constancy for uncalibrated color image harmonization through acquisition time, space and imaging sensors.
- Geographic Information Science (GIScience), capable of geospatial reasoning to answer questions such as: what, where and how/why? It deals with discrete geospatial objects (geo-objects) of semantic (symbolic), numeric variables (geo-fields) and discretized numeric variables of sub-symbolic quality (field-objects). In geographic information systems (GIS), geo-fields are raster numeric variables while geo-fields and field-objects are raster categorical variables eligible for vector data representation.

Digital skills

SELF-ASSESSMENT				
Information processing	Communication	Content creation	Safety	Problem solving
Proficient user	Proficient user	Proficient user	Basic user	Basic user

Digital skills - Self-assessment grid

Programming languages: C/C++, Fortran, Basic, Pascal, Prolog, MATLAB, IDL

Operating systems: MS Dos, Windows, Unix

Commercial image processing software toolboxes: ENVI by Research Systems Inc.

Commercial software toolboxes for data visualization, analysis and processing: MATLAB by the Math Works Inc, IDL by Research Systems Inc.

Geographic information systems: ArcGIS, ArcCatalog.

Other commercial software tools: MS Word, MS PowerPoint, MS Excel, MS Project, MS Explorer, MS Visual Studio.

Other skills

Teaching experience

- Sept. 12-13, 2016 Contributor to the GEOBIA 2016 Doctoral Colloquium, conceived for PhD students and recent postdocs, in collaboration with senior OBIA researchers from Z-GIS and ITC/the University of Twente, Enschede, the Netherlands, in the framework of the GEOBIA 2016 Conference, 14-16 September 2016 at ITC/the University of Twente, Enschede, the Netherlands.

- June 2-3, 2014 Workshop for Ph.D. and MS students – Hands on the Satellite Image Automatic Mapper™ software toolbox, In collaboration with Prof. Thomas Blaschke, Prof. Stefan Lang and Prof. Dirk Tiede, Department of Geoinformatics - Z_GIS, Integrated Spatial Analysis (ISA), University of Salzburg.
- March – May 2014 Visiting professor, University of Modena and Reggio E., Italy, Academic year in Electronic Engineering: 2013-1014, Teaching course (30 hours + testing) for M.S. and Ph.D. students in “Advanced Electronic Systems: Neuromorphic Engineering - Adaptive oxide electronics (memristors) for fabricating devices to mimic human brain functionalities". Hosting professor: Prof. P. Pavan.
- Feb. 2011 Teaching assistant in the Spring 2011 Geog778B course, titled "Remote Sensing for Global Carbon Monitoring," University of Maryland, Department of Geographical Sciences, Teaching Professor: Dr. L. Boschetti.
- Dec. 2003 Teaching assistant in "Tecniche avanzate di elaborazione dei segnali," corso di Laurea in Ingegneria e Telecomunicazioni, academic year 2003-2004, first semester, Univ. di Trento, Teaching Professor: Prof. L. Bruzzone.
- Dec. 2002 Teaching assistant in "Tecniche avanzate di elaborazione dei segnali," corso di Laurea in Ingegneria e Telecomunicazioni, academic year 2002-2003, first semester, Univ. di Trento, Teaching Professor: Prof. L. Bruzzone.

Participation in training (mentoring)

- 6 PhD students.
- 5 MS students.

Professional society activities

- Jan. 2001-May 2006. Associate editor of the IEEE Transactions on Neural Networks journal.
- Sep. 2012. Program Committee, Workshop at the GIScience conference, 18-20 September 2012, Columbus, Ohio: Geographic object based multi-scale analysis: Developing a methodological framework for GIScience.
- Sept. 28, 2015 (invited) European Commission - European Space Expo, Milan, Italy, 18 Sept. – 4 Oct. 2015: Food and Space. Andrea Baraldi, "Agricultural Applications of Airborne/Spaceborne Images – If You Don't Measure It, You Can't Improve It," University of Salzburg and University of Naples Federico II.

Refereeing

> 90 papers submitted for consideration for publication in IEEE Trans. Fuzzy Systems:5, IEEE Trans. Neural Networks: 43, IEEE Trans. Image Processing: 3, IEEE Trans. Knowledge and Data Engineering: 1, IEEE Trans. Systems, Man, and Cybernetics: 2, IEEE Trans. Geoscience and Remote Sensing: 26, IEEE Geoscience and Remote Sensing Letters: 2, Remote Sensing: 4.

Participation in European, international and national programmes

Institution of affiliation, Project Name and Identifier, Funded by, Duration, Own amount / Budget, Other partners

- ISSIA-CNR (WP Leader) Landslide Early-Warning Integrated System (LEWIS), EVG1-CT-2001-00055, EU-EC, 2002-2006, € 190.00 / ..., Univ. Bari (PI), Canada Centre of Remote Sensing (CCRS), Univ. of Surrey, Silogic, Planetek, Altamira.
- MEEO srl Italy (PI), Knowledge-centred Earth Observation (KEO) Extensions and Installations (KEI), ESA, 2007-2009, € 196.241, none.

- MEEO srl Italy (PI), Classification Application-services and Reference Datasets (CARD), Letter of Invitation n° RES-POE/2007/525/LG/cb, ESA, 2008-2010, € 265.720, none.
- MEEO srl Italy (PI), Support by Pre-classification to Specific Applications (SPA), Letter of Invitation n° RES-POE/2008/497/EC/sp, ESA, 2009-2011, € 469.903, none.
- MEEO srl Italy (WP Leader), Spatial Observation Services and Infrastructure (SOSI), Letter of Invitation n° RES-POE/2008/488/LG/cb, ESA, 2009, € 29.996 / ..., Siemens Austria (PI).
- MEEO srl Italy (PI), Support to the RoKEO PECS project (SRoKEO), Letter of Invitation n° RES-POE/2008/292/cb, ESA, 2009-2011, € 79.704 / ..., Romanian Space Agency.
- MEEO srl Italy (PI), Image Information Mining - Time Series (IIM-TS), ESA, 2009, € 13.576 / ..., Sarmap SA.
- Baraldi Consultancy in Remote Sensing (WP leader), BIOdiversity Multi-Source Monitoring System: from Space TO Species (BIO-SOS), FP7-SPACE-2010-1, EU-EC, 2010-2012, € 360.000 /..., ISSIA-CNR (PI), Alterra, IRD, Uni. of Bari, ATREE, Planetek, ICETA, Univ. Of Aberystwyth, ASI, Uni. of Milano-Bicocca.
- University of Maryland, Department of Geographical sciences (PI), National Aeronautics and Space Administration (NASA) Land-Cover and Land-Use Change (LCLUC) Program /.../ University of Maryland, University of South Dakota.
- Univ. Salzburg, Z-GIS (PI), ASAP11 project call, AutoSentinel2/3 project (Knowledge-based pre-classification of Sentinel-2/3 images for operational product generation and content-based image retrieval), ID 848009, FFG, 2015-2016, € 125.580.
- Univ. Salzburg, Z-GIS (PI), ICT of the Future project call, SemEO project (Semantic enrichment of optical EO data to enhance spatio-temporal querying capabilities), FFG, 2016-2017, € 128.947.

Professional references

- Prof. Franco Prodi, ISAC-CNR, Via P. Gobetti 101, Bologna 10129, Italy. Phone: +39-051-6399561, Email: f.prodi@isac.cnr.it
- Prof. and Chair Christophere Justice, 2181A LeFrak Hall, Department of Geographical Sciences, University of Maryland, College Park, MD 20742, USA. Phone: +1-301-4051600, Email: cjustice@umd.edu
- Dr. Alessandro Annoni, Head of the Spatial Data Infrastructures Unit, EC Joint Research Center, Via Fermi, Ispra (Varese), Italy. Phone: +39-0332-786166, Email: alessandro.annoni@jrc.ec.europa.eu
- Prof. Paolo Pavan, Engineering Department, University of Modena and Reggio Emilia, Italy. Phone: +39-059-2056158, Email: paolo.pavan@unimore.it
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- Dr. Virginia Puzzolo, European Commission Research Executive Agency, Covent Garden Place Rogier, 16 1049 Brussels Belgium, Email: virginia.puzzolo@ec.europa.eu
- Prof. Stefan Lang, Head Integrated Spatial Analysis (ISA), Interfaculty Department of Geoinformatics - Z_GIS, University of Salzburg, Schillerstr. 30, Building 15, 3rd Floor, 5020 Salzburg, Austria. Tel: +43 (0) 662-80447562, Email: stefan.lang@sbg.ac.at
- Prof. Thomas Blaschke, Deputy Director of the Interfaculty Department of Geoinformatics - Z_GIS, Integrated Spatial Analysis (ISA), University of Salzburg, Schillerstr. 30, 5020 Salzburg, Austria. . Tel: +43 (0) 662-80447525, Email: Thomas.Blaschke@sbg.ac.at
- Prof. Dirk Tiede, Interfaculty Department of Geoinformatics - Z_GIS, Integrated Spatial Analysis (ISA), University of Salzburg, Schillerstr. 30, 5020 Salzburg, Austria. Tel: +43 (0) 662-80447565, Email: dirk.tiede@sbg.ac.at

Driving licence B

ADDITIONAL INFORMATION

Publications

List of awards for work and publications

- Sept. 2015. Winner of the T-Systems Big Data Challenge of the Copernicus Masters 2015, with the project and feasibility study titled: "Satellite Image Automatic Mapper™ (SIAM™)-Through-Time (SIAMT^2) for spaceborne/ airborne multi-spectral image time-sequence classification in operating mode and content-based image database retrieval" (Project ID 150688)". Final project title: D. Tiede, A. Baraldi, M. Sudmanns, M. Belgiu, and S. Lang, "ImageQuerying (IQ): Off-the-shelf Image Content Extraction & Querying Across Time and Space". Awards Ceremony on Oct. 20, 2015 at the Satellite Masters Conference, 20-22 Oct. 2015, German Federal Ministry of Transport and Digital Infrastructure, Invalidenstraße 444, 10115 Berlin, Germany.
- May 2015, IGARSS 2015, Milan, Italy, 27-31 July 2015. IEEE GRSS Data Fusion Contest, paper “Geospatial 2D AND 3D object-based classification and 3D reconstruction of ISO-containers depicted in a LiDAR dataset and aerial imagery of a harbor", ranked 2nd best.

List of selected publications or working papers

[55] **A. Baraldi**, M. L. Humber, D. Tiede and S. Lang, “GEO-CEOS stage 4 validation of the Satellite Image Automatic Mapper lightweight computer program for ESA Earth observation Level 2 product generation – Part 1: Theory”, Cogent Geoscience, vol. 4, 2018. DOI: 10.1080/23312041.2018.1467357.

[54] **A. Baraldi**, M. L. Humber, D. Tiede and S. Lang, “GEO-CEOS stage 4 validation of the Satellite Image Automatic Mapper lightweight computer program for ESA Earth observation Level 2 product generation – Part 2: Validation”, Cogent Geoscience, vol. 4, 2018. DOI: 10.1080/23312041.2018.1467254.

[53] M. Sudmanns, D. Tiede, S. Lang and **A. Baraldi**, “Semantic and syntactic interoperability in online processing of big Earth observation data”, Int. J. of Digital Earth, vol. 11, no. 1, pp. 95-112, 2018. DOI: 10.1080/17538947.2017.1332112.

[52] **A. Baraldi**, D. Tiede, M. Sudmanns, and S. Lang, “Systematic ESA EO Level 2 product generation as pre-condition to semantic content-based image retrieval and information/knowledge discovery in EO image databases,” 2017 Conf. on Big Data From Space, BiDS’17, Toulouse, France, 28-30 March, 2017.

[51] D. Tiede, **A. Baraldi**, M Sudmanns, M. Belgiu and S. Lang, "Architecture and prototypical implementation of a semantic querying system for big earth observation image bases," European Journal of Remote Sensing, vol. 50, no. 1, pp. 452-463, Aug. 2017. DOI: 10.1080/22797254.2017.1357432.

[50] M. Sudmanns, D. Tiede, S. Lang and **A. Baraldi,** "Semantic and syntactic interoperability in online processing of big Earth observation data", Int. J. of Digital Earth, 31 May 2017. DOI: 10.1080/17538947.2017.1332112.

[49] **Andrea Baraldi**, Michael Laurence Humber, Dirk Tiede, Stefan Lang, "Stage 4 validation of the Satellite Image Automatic Mapper lightweight computer program for Earth observation Level 2 product generation, Part 1 Theory," Subjects: Computer Vision and Pattern Recognition (cs.CV), arXiv:1701.01930. Date: 8 Jan. 2017. [Online] Available: https://arxiv.org/ftp/arxiv/papers/1701/1701.01930.pdf

[48] **Andrea Baraldi**, Michael Laurence Humber, Dirk Tiede, Stefan Lang, "Stage 4 validation of the Satellite Image Automatic Mapper lightweight computer program for Earth observation Level 2 product generation, Part 2 Validation," Subjects: Computer Vision and Pattern Recognition (cs.CV), arXiv:1701.01932. Date: 8 Jan. 2017. [Online] Available: https://arxiv.org/ftp/arxiv/papers/1701/1701.01932.pdf

[47] **Andrea Baraldi**, Dirk Tiede, Stefan Lang, "Automated Linear-Time Detection and Quality Assessment of Superpixels in Uncalibrated True- or False-Color RGB Images," Subjects: Computer Vision and Pattern Recognition (cs.CV), arXiv:1701.01940. Date: 8 Jan. 2017. [Online] Available: https://arxiv.org/ftp/arxiv/papers/1701/1701.01940.pdf

[46] **Andrea Baraldi**, , João V. B. Soares, "Multi-Objective Software Suite of Two-Dimensional Shape Descriptors for Object-Based Image Analysis," Subjects: Computer Vision and Pattern Recognition (cs.CV), arXiv:1701.01941. Date: 8 Jan. 2017. [Online] Available: https://arxiv.org/ftp/arxiv/papers/1701/1701.01941.pdf

[45] **Andrea Baraldi**, Francesca Despini, Sergio Teggi, "Multi-spectral Image Panchromatic Sharpening, Outcome and Process Quality Assessment Protocol," Subjects: Computer Vision and Pattern Recognition (cs.CV), arXiv:1701.01942. Date: 8 Jan. 2017. [Online] Available: https://arxiv.org/ftp/arxiv/papers/1701/1701.01942.pdf

[44] **A. Baraldi**, "Automatic Spatial Context-Sensitive Cloud/Cloud-Shadow Detection in Multi-Source Multi-Spectral Earth Observation Images – AutoCloud+," Invitation to tender ESA/AO/1-8373/15/I-NB – "VAE: Next Generation EO-based Information Services", 3 Nov. 2015. DOI: 10.13140/RG.2.2.34162.71363. Subjects: Computer Vision and Pattern Recognition (cs.CV), arXiv: 1701.04256. Date: 8 Jan. 2017. [Online] Available: https://arxiv.org/ftp/arxiv/papers/1701/1701.04256.pdf

[43] **A. Baraldi**, D. Tiede, M. Sudmanns, M. Belgiu, and S. Lang, "Automated near real-time Earth observation Level 2 product generation for semantic querying," GEOBIA 2016, 14-16 Sept. 2016, University of Twente Faculty of Geo-Information and Earth Observation (ITC), Enschede, The Netherlands.

[42] D. Tiede, **A. Baraldi**, M. Sudmanns, M. Belgiu, and S. Lang, "ImageQuerying – Automatic real-time information extraction and content-based image retrieval in big EO image databases," submitted (Oral presentation and poster session), Second joint Workshop of the EARSeL Special Interest Group on Land Use & Land Cover and the NASA LCLUC Program, Prague, Czech Republic, May 6-7, 2016.

[41] D. Tiede, **A. Baraldi**, M. Sudmanns, M. Belgiu, and S. Lang, "ImageQuerying (IQ) – Earth Observation Image Content Extraction & Querying across Time and Space," submitted (Oral presentation and poster session), ESA 2016 Conf. on Big Data From Space, BIDS '16, Santa Cruz de Tenerife, Spain, 15-17 March, 2016.

[40] A.-V. Vo, L. Truong-Hong, D.F. Laefer, D. Tiede, S. d'Oleire-Oltmanns, **A. Baraldi**, M. Shimoni, G. Moser, D. Tuia "Processing of Extremely high resolution LiDAR and RGB data: Outcome of the 2015 IEEE GRSS Data Fusion Contest. Part--B: 3D contest," *IEEE J. Sel. Topics Appl. Earth Observ. Remote Sens.*, vol. 9, no. 12, pp. 5560-5575, Dec. 2016.

[39] **A. Baraldi** and M. Humber, "Quality assessment of pre-classification maps generated from spaceborne/airborne multi-spectral images by the Satellite Image Automatic Mapper™ and Atmospheric/Topographic Correction™-Spectral Classification software products: Part 1 – Theory," *IEEE J. Sel. Topics Appl. Earth Observ. Remote Sens.,* vol. 8, no. 3, pp. 1307-1329, March 2015.

[38] C. García-Feced, C.J. Weissteiner, **A. Baraldi**, M.L. Paracchini, J. Maes, G. Zulian, M. Kempen, B. Elbersen, and M. Pérez-Soba, "Semi-natural vegetation in agricultural land: European map and links to ecosystem service supply," *Agronomy for Sustainable Development*, vol. 8, no. 31, pp. 1-13, July 2014. doi: 10.1007/s13593-014-0238-1

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[35] N. Clerici, C. J. Weissteiner, M. L. Paracchini, L. Boschetti, **A. Baraldi**, and P. Strobl, "Pan-European distribution modelling of stream riparian zones based on multi-source Earth Observation data," *Ecological Indicators*, vol. 24, pp. 211–223, Jan. 2013.

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(by rules) at the first stage of a two-stage hybrid remote sensing image understanding system, Part I: Introduction (to be continued)," in *Earth Observation*, InTech Open Access Publisher, 2012, pp. 63-98.

[30] **A. Baraldi**, "Satellite Image Automatic Mapper™ (SIAM™) - A turnkey software executable for automatic near real-time multi-sensor multi-resolution spectral rule-based preliminary classification of spaceborne multi-spectral images", *Recent Patents on Space Technology*, Bentham Science Publishers, vol. 1, no. 2, pp. 81-106, Dec. 2011.

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[27] **A. Baraldi**, L. Durieux, D. Simonetti, G. Conchedda, F. Holecz, and P. Blonda, "Automatic spectral rule-based preliminary classification of radiometrically calibrated SPOT-4/-5/IRS, AVHRR/MSG, AATSR, IKONOS/QuickBird/OrbView/GeoEye and DMC/SPOT-1/-2 imagery – Part I: System design and implementation," *IEEE Trans. Geosci. Remote Sensing,* vol. 48, no. 3, pp. 1299 - 1325, March 2010.

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[-] **A. Baraldi**, L. Durieux, D. Simonetti, G. Conchedda, F. Holecz, and P. Blonda, Corrections to "Automatic Spectral Rule-Based Preliminary Classification of Radiometrically Calibrated SPOT-4/-5/IRS, AVHRR/MSG, AATSR, IKONOS/QuickBird/OrbView/GeoEye, and DMC/SPOT-1/-2 Imagery", *IEEE Trans. Geosci. Remote Sensing*, vol. 48, no. 3, p. 1635, March 2010.

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ANNEXES

- BaraldiSignature.jpg

europass

Language passport

Andrea Baraldi

Mother tongue(s)	Foreign language(s)
Italian	English

English

Self-assessment of language skills

UNDERSTANDING		SPEAKING		WRITING
Listening	Reading	Spoken interaction	Spoken production	Writing
C2 Proficient user	C2 Proficient user	C2 Proficient user	C2 Proficient user	C2 Proficient user

Certificates and diplomas

Title	Awarding body	Date	Level*
High School Diploma	Rex Putnam High School, Milwaukie, OR (USA)	01/07/1981	C2

Linguistic and intercultural experience

Description	Duration
Using languages at school and work: ▪ 1980-1981 AFS exchange student at Rex Putnam High School in Milwaukie, OR. ▪ 1997-1999. Post-doctoral researcher at the International Computer Science Institute (ICSI), Berkeley, CA (USA). ▪ 2010-2013. Research Associate Professor at the Univ. Maryland, College Park, MD.	–

Common European Framework of Reference for Languages - Self-assessment grid

		A1 Basic user	A2 Basic User	B1 Independent user	B2 Independent user	C1 Proficient user	C2 Proficient user
Understanding	Listening	I can understand familiar words and very basic phrases concerning myself, my family and immediate concrete surroundings when people speak slowly and clearly.	I can understand phrases and the highest frequency vocabulary related to areas of most immediate personal relevance (e.g. very basic personal and family information, shopping, local area, employment). I can catch the main point in short, clear, simple messages and announcements.	I can understand the main points of clear standard speech on familiar matters regularly encountered in work, school, leisure, etc. I can understand the main point of many radio or TV programmes on current affairs or topics of personal or professional interest when the delivery is relatively slow and clear.	I can understand extended speech and lectures and follow even complex lines of argument provided the topic is reasonably familiar. I can understand most TV news and current affairs programmes. I can understand the majority of films in standard dialect.	I can understand extended speech even when it is not clearly structured and when relationships are only implied and not signalled explicitly. I can understand television programmes and films without too much effort.	I have no difficulty in understanding any kind of spoken language, whether live or broadcast, even when delivered at fast native speed, provided I have some time to get familiar with the accent.
	Reading	I can understand familiar names, words and very simple sentences, for example on notices and posters or in catalogues.	I can read very short, simple texts. I can find specific, predictable information in simple everyday material such as advertisements, prospectuses, menus and timetables and I can understand short simple personal letters.	I can understand texts that consist mainly of high frequency everyday or job-related language. I can understand the description of events, feelings and wishes in personal letters.	I can read articles and reports concerned with contemporary problems in which the writers adopt particular attitudes or viewpoints. I can understand contemporary literary prose.	I can understand long and complex factual and literary texts, appreciating distinctions of style. I can understand specialised articles and longer technical instructions, even when they do not relate to my field.	I can read with ease virtually all forms of the written language, including abstract, structurally or linguistically complex texts such as manuals, specialised articles and literary works.
Speaking	Spoken interaction]	I can interact in a simple way provided the other person is prepared to repeat or rephrase things at a slower rate of speech and help me formulate what I'm trying to say. I can ask and answer simple questions in areas of immediate need or on very familiar topics.	I can communicate in simple and routine tasks requiring a simple and direct exchange of information on familiar topics and activities. I can handle very short social exchanges, even though I can't usually understand enough to keep the conversation going myself.	I can deal with most situations likely to arise whilst travelling in an area where the language is spoken. I can enter unprepared into conversation on topics that are familiar, of personal interest or pertinent to everyday life (e.g. family, hobbies, work, travel and current events).	I can interact with a degree of fluency and spontaneity that makes regular interaction with native speakers quite possible. I can take an active part in discussion in familiar contexts, accounting for and sustaining my views.	I can express myself fluently and spontaneously without much obvious searching for expressions. I can use language flexibly and effectively for social and professional purposes. I can formulate ideas and opinions with precision and relate my contribution skilfully to those of other speakers.	I can take part effortlessly in any conversation or discussion and have a good familiarity with idiomatic expressions and colloquialisms. I can express myself fluently and convey finer shades of meaning precisely. If I do have a problem I can backtrack and restructure around the difficulty so smoothly that other people are hardly aware of it.
	Spoken production	I can use simple phrases and sentences to describe where I live and people I know.	I can use a series of phrases and sentences to describe in simple terms my family and other people, living conditions, my educational background and my present or most recent job.	I can connect phrases in a simple way in order to describe experiences and events, my dreams, hopes and ambitions. I can briefly give reasons and explanations for opinions and plans. I can narrate a story or relate the plot of a book or film and describe my reactions.	I can present clear, detailed descriptions on a wide range of subjects related to my field of interest. I can explain a viewpoint on a topical issue giving the advantages and disadvantages of various options.	I can present clear, detailed descriptions of complex subjects integrating sub-themes, developing particular points and rounding off with an appropriate conclusion.	I can present a clear, smoothly-flowing description or argument in a style appropriate to the context and with an effective logical structure which helps the recipient to notice and remember significant points.
Writing	Writing	I can write a short, simple postcard, for example sending holiday greetings. I can fill in forms with personal details, for example entering my name, nationality and address on a hotel registration form.	I can write short, simple notes and messages. I can write a very simple personal letter, for example thanking someone for something.	I can write simple connected text on topics which are familiar or of personal interest. I can write personal letters describing experiences and impressions.	I can write clear, detailed text on a wide range of subjects related to my interests. I can write an essay or report, passing on information or giving reasons in support of or against a particular point of view. I can write letters highlighting the personal significance of events and experiences.	I can express myself in clear, well-structured text, expressing points of view at some length. I can write about complex subjects in a letter, an essay or a report, underlining what I consider to be the salient issues. I can select a style appropriate to the reader in mind.	I can write clear, smoothly-flowing text in an appropriate style. I can write complex letters, reports or articles which present a case with an effective logical structure which helps the recipient to notice and remember significant points. I can write summaries and reviews of professional or literary works.

arpae
agenzia prevenzione ambiente energia emilia-romagna

B

DICHIARAZIONE SOSTITUTIVA DI ATTO NOTORIO E DI CERTIFICAZIONE AI SENSI DEGLI ARTT. 46 E 47 DEL DPR n. 445/2000

PROCEDURA DI CONFERIMENTO DI INCARICO DI PRESTAZIONE D'OPERA INTELLETTUALE DI NATURA OCCASIONALE NELL'AMBITO DEL PROGETTO "18LET". ([1])

Il/la sottoscritto/a BARALDI ANDREA

sotto la propria responsabilità e consapevole di quanto disposto dall'art. 76 del DPR n. 445/2000 e dall'art. 495 del c.p. in caso di dichiarazioni mendaci,

DICHIARA

ai fini di quanto previsto dall'art. 1 c. 42 lett. h) della L. 190/2012

- che non è coniuge, convivente, né parente, nè affine fino al quarto grado compreso del soggetto conferente l'incarico in oggetto, del responsabile del procedimento in esame, nonchè del responsabile del progetto([2]);
- che non sussistono rapporti personali di debito/credito, rapporti personali di tipo economico, commerciale, professionale, finanziario con il soggetto conferente l'incarico in oggetto, con il responsabile del procedimento in esame, nonchè con il responsabile del progetto;
- che, per quanto di propria conoscenza, non presta attività a favore di soggetti sottoposti a procedure sanzionatorie da parte di Arpae o per le quali l'Agenzia svolge un ruolo istruttorio/autorizzatorio in procedimenti amministrativi;
- che non svolge attività in conflitto di interessi con le funzioni istituzionali di Arpae, avendo riguardo anche alle disposizioni di cui all'art. 7 del DPR n. 62/2013, applicabili per quanto compatibili con riferimento ai contenuti ed alla natura del contratto di lavoro autonomo in oggetto ([3]);
- che non sussiste alcuna delle condizioni di incompatibilità di cui all'art. 5 della Disciplina in materia di conferimento di incarichi di prestazione d'opera intellettuale, con contratti di lavoro autonomo presso Arpae Emilia-Romagna, approvata con DDG 130/2017.([4])
- che non è già lavoratore privato o pubblico collocato in quiescenza (art. 5 c. 9 del DL 95/2012 convertito nella L. 135/2012 e successive modifiche con L. 114/2014 e L. 124/2015).

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1 La presente dichiarazione sarà pubblicata sul sito web istituzionale di Arpae, in caso di conferimento dell'incarico in esame al soggetto sottoscrivente.

2 Soggetto conferente l'incarico è la dott.ssa Tiziana Paccagnella; Responsabile del Procedimento è il dott. Lucio Botarelli; Responsabile di progetto è il dott. Lucio Botarelli.

3 Vedi Allegato 1) - art. 7 del DPR 62/2013.

4 Vedi Allegato 1) - estratto della Disciplina approvata con DDG 130/2017.

DICHIARA ALTRESI'

ai fini di quanto previsto dall'art. 15 c. 1 lett. c) del d. lgs. 33/2013

(barrare la casella)

☒ che non svolge incarichi e/o non ha la titolarità di cariche in enti di diritto privato regolati o finanziati dalla Pubblica Amministrazione e/o non svolge attività professionali;

☐ che svolge incarichi e/o ha la titolarità di cariche in enti di diritto privato regolati o finanziati dalla Pubblica Amministrazione e/o svolge attività professionali, e precisamente:
(riportare gli incarichi e/o le cariche in enti di diritto privato regolati o finanziati da PA e/o attività professionali)

- incarico/carica di: _____;
- a favore dell'ente: _____;
- attività professionale di: _____;
- a favore di: _____;

Modena lì 2 Agosto 2019

DOCUMENTO FIRMATO

La presente istanza deve essere sottoscritta dall'interessato in presenza del dipendente addetto ovvero sottoscritta e presentata unitamente a copia fotostatica non autenticata di un documento di identità del sottoscrittore (art. 38 D.P.R. n. 445/2000).

Spazio riservato all'ufficio ricevente, da utilizzare in alternativa all'invio della copia fotostatica del documento di identità.

Certifico apposta, in mia presenza, la firma del dichiarante. Il dipendente addetto _____

PGSIM/2018/
Bologna,

Gent.mo
Ing. Andrea Baraldi

TP\ls

Oggetto: Contratto per prestazione occasionale

Con la presente Le assegniamo il presente incarico occasionale alle seguenti principali condizioni:

1. Oggetto

Forma oggetto del presente incarico l'attività di:

- analisi delle migliori pratiche e procedure per la generazione automatica di prodotti e servizi informativi operativi, in tempo reale e per fini molteplici, generabili da immagini di osservazione della Terra acquisite principalmente da sensori ottici satellitari.

Nell'espletamento dell'incarico che Le viene conferito, ferma restando la Sua piena autonomia, Ella terrà conto delle nostre indicazioni al fine di coordinare la Sua attività con i programmi stabiliti dall'Agenzia.
Le attività oggetto del presente incarico dovranno essere espletate nel rispetto delle disposizioni di cui al DPR n. 62/2013 (Codice di comportamento dei dipendenti pubblici) e delle disposizioni di cui al Codice di comportamento aziendale di Arpae Emilia-Romagna, applicabili per quanto compatibili con il presente contratto di lavoro autonomo.

2. Impegno personale

Per lo svolgimento di quanto indicato al punto 1., Lei assicurerà un puntuale e corretto espletamento delle attività previste, senza alcun vincolo di orario.

3. Durata

Le attività di cui al punto1) saranno espletate entro il 31/12/2018.

4. Condizioni economiche

Per lo svolgimento delle attività di cui al punto 1. Le verrà riconosciuto un compenso forfetario lordo di **euro 4.900,00,** comprensivo di tutte le spese relative allo svolgimento del presente incarico occasionale, che viene da Lei accettato senza riserva alcuna.

Prendiamo atto della Sua dichiarazione, sotto la Sua unica responsabilità, che le prestazioni oggetto del nostro accordo sono di natura occasionale e sono quindi escluse dal campo di applicazione dell'I.V.A.

5. Pagamenti

L'importo a Lei dovuto sarà assoggettato a ritenuta d'acconto obbligatoria pari al 20% (venti percento), che verrà operata, al pagamento, sul valore lordo totale per il quale ci verrà rilasciata la ricevuta (notula) in cui dovrà essere riportato il numero dell'atto di conferimento dell'incarico di natura occasionale in oggetto.

Tale ricevuta, completa di bollo se dovuto, dovrà essere intestata a:

Arpae Emilia-Romagna, sede legale Via Po, 5 – 40139 Bologna. C.F. e P.IVA: 04290860370

La ricevuta dovrà essere trasmessa esclusivamente a mezzo posta elettronica al seguente indirizzo pec: **workflow_amm@cert.arpa.emr.it**

Arpae provvederà ai pagamenti entro 30 giorni dalla data di ricevimento della ricevuta.

Lei si impegna a comunicare ad Arpae eventuali modifiche al Suo regime fiscale che dovessero intercorrere tra il momento dell'emissione della ricevuta (notula) e il momento della liquidazione della stessa da parte della scrivente Amministrazione.

Lei si impegna, altresì, a comunicare ad Arpae, prima della corresponsione del compenso pattuito, l'eventuale superamento del limite di esenzione dalla contribuzione INPS, pari a 5.000,00 euro lordi annui (anno solare).

6. Recesso

L'eventuale rinuncia all'incarico da parte Sua o l'eventuale revoca da parte nostra dell'incarico conferitoLe dovrà essere notificata, da una parte all'altra, con un preavviso di almeno 7 giorni.

Le verrà compensata comunque solo l'attività da Lei effettivamente svolta fino a quel momento.

In caso di violazione delle disposizioni di cui al DPR n. 62/2013 (Codice di comportamento dei dipendenti pubblici) e/o delle disposizioni di cui al Codice di comportamento aziendale di Arpae Emilia-Romagna, applicabili - per quanto compatibili - alla prestazione oggetto del presente incarico, si prevede la possibilità per Arpae di risolvere anticipatamente il presente contratto di prestazione occasionale, nel rispetto dei principi di gradualità e proporzionalità.

7. Impegno di riservatezza

Lei è tenuto/a al più assoluto riserbo sui dati e sulle informazioni di cui venisse a conoscenza durante l'esecuzione dell'attività di cui all'oggetto.

E' vietata la riproduzione di qualsiasi documento.

Lei si impegna, inoltre, a mantenere riservate e a non divulgare a terzi tutte le informazioni trasmesseLe nell'ambito del presente incarico.

8) Trattamento dei dati personali

Arpae in relazione alla raccolta dei dati personali del collaboratore, effettuata in occasione della sottoscrizione del presente contratto, si impegna a rispettare quanto previsto dal D. Lgs. n.

196/2003. Si allega al presente contratto l'informativa prevista dall'art. 13 del sopra citato Decreto Legislativo.

9) Controversie

Per qualunque controversia dovesse insorgere nell'interpretazione e nell'esecuzione del presente contratto il foro esclusivamente competente è quello di Bologna.

10) Clausole finali

Il presente contratto formalizza la totalità degli accordi tra le parti. Qualsiasi modificazione o correzione dovrà essere preventivamente concordata per iscritto.

La prestazione richiesta, sia per le sue specifiche caratteristiche (nessun vincolo gerarchico, nessuna predisposizione di direttive attinenti l'intrinseco svolgimento dell'attività, nessun obbligo di orario di lavoro), sia perché così voluto e dichiarato dalle parti, non comporta alcun rapporto di lavoro subordinato.

L'Ente resta sollevato da ogni e qualsiasi responsabilità derivante dall'espletamento dell'incarico.

Il presente contratto è soggetto a registrazione in caso d'uso a cura e spese della parte richiedente.

In ottemperanza a quanto previsto dall'art. 17 del DPR n. 62/2013, si allega al presente contratto copia dello stesso DPR n. 62/2013 (Codice di comportamento dei dipendenti pubblici). Si allega, altresì, al presente contratto, il Codice di comportamento aziendale di Arpae Emilia-Romagna, in ottemperanza a quanto previsto dall'art. 14 c. 6 dello stesso Codice. I suddetti documenti sono consultabili anche sul sito web di Arpae, nella Sezione "Amministrazione Trasparente", sottosezione "Disposizioni Generali- Atti Generali".

L'incaricato è, altresì, informato che sul sito web di Arpae, nella Sezione "Amministrazione Trasparente", sottosezione "Anticorruzione", è pubblicato il *Piano triennale per la prevenzione della Corruzione*.

Nel formularLe i migliori auguri di una proficua collaborazione La preghiamo, ove d'accordo con il contenuto del contratto, di restituire all'Ente copia della presente da Lei sottoscritta, pagina per pagina, per integrale accettazione e conferma del contenuto del contratto medesimo, nonché dei relativi allegati.

Distinti saluti.

IL DIRETTORE
Servizio Idro-Meteo-Clima
Arpae Emilia-Romagna
- Dott.ssa Tiziana Paccagnella –

Allegati:

1) Informativa sulla privacy ex art. 13 D.lgs. 196/2003;

2) DPR n. 62/2013 (Codice di comportamento dei dipendenti pubblici), reperibile al seguente link: https://www.arpae.it/cms3/documenti/_cerca_doc/amministrativi/Codice_comportamento_DPR62_2013.pdf ;

3) Codice di Comportamento aziendale di Arpae Emilia-Romagna, reperibile al seguente link: https://www.arpae.it/cms3/documenti/_cerca_doc/trasparenza/personale/Codice_aziendale_2017_pubblicato.pdf .

Per accettazione

Il professionista
Ing. Andrea Baraldi

.....

Ai sensi dell'art. 1341 e 1342 C.C. si intendono specificatamente approvate le disposizioni contenute negli artt.:

6. Recesso
7. Impegno di riservatezza
8. Trattamento dei dati personali
9. Controversie
10. Clausole finali

Per accettazione

Il professionista
Ing. Andrea Baraldi

.....

Informativa sul trattamento dei dati personali ai sensi del Regolamento (UE) 2016/679 (RGPD)

Arpae Emilia-Romagna, in qualità di titolare del trattamento dei dati personali (con sede in Via Po 5, 40139 Bologna, dirgen@cert.arpa.emr.it - Centralino 051- 6223811), tratterà i dati personali conferiti con modalità prevalentemente informatiche e telematiche, per le finalità previste dal Regolamento (UE) 2016/679 (RGPD), in particolare per l'esecuzione dei propri compiti di interesse pubblico o comunque connessi all'esercizio dei propri pubblici poteri, ivi incluse le finalità di archiviazione, di ricerca storica e di analisi per scopi statistici.

I dati saranno trattati per tutto il tempo di durata del procedimento amministrativo o della attività tecnica di Arpae che la riguarda e successivamente saranno mantenuti in conformità alle norme sulla conservazione della documentazione amministrativa.

I dati saranno trattati esclusivamente dal personale e da collaboratori di Arpae Emilia-Romagna o dalle imprese espressamente nominate come responsabili esterni del trattamento. Al di fuori di queste ipotesi i dati non saranno comunicati a terzi né diffusi, se non nei casi specificamente consentiti dall'interessato o previsti dal diritto nazionale o dell'Unione Europea.

Gli interessati hanno il diritto di chiedere al titolare del trattamento l'accesso ai propri dati personali, la rettifica o la cancellazione degli stessi, la limitazione del trattamento che li riguarda o di opporsi al trattamento (artt. 15 e ss. del RGPD). L'apposita istanza ad Arpae è presentata contattando il DPO (Responsabile della Protezione dei Dati) all'indirizzo dpo@arpae.it presso Arpae.

Gli interessati, ricorrendone i presupposti, hanno, altresì, il diritto di proporre reclamo secondo le procedure previste dagli artt. 77 e ss. del RGPD.

N. Proposta: PDTD-2018-772 del 27/09/2018

Centro di Responsabilità: Servizio Idro-Meteo-Clima

OGGETTO: Servizio Idro Meteo Clima. Conferimento incarico di prestazione d'opera intellettuale di natura occasionale all'ing. Andrea Baraldi.

PARERE CONTABILE

Il/La sottoscritto/a Dott/Dott.ssa Ranieri Daniela, Responsabile Amministrativo/a di Servizio Idro-Meteo-Clima, esprime parere di regolarità contabile ai sensi del Regolamento Arpae sul Decentramento amministrativo.

Data 01/10/2018

Il/La Responsabile Amministrativo/a

europass Curriculum vitae

PERSONAL INFORMATION

Andrea Baraldi

Sex | Date of birth | Nationality

POSITION

Senior Researcher, Ph.D.

WORK EXPERIENCE

16/02/2018–Present

Senior scientist

Agenzia Spaziale Italiana (Italian Space Agency, ASI)
Via del Politecnico, 00133 Rome (Italy)
www.asi.it

- Assigned to the Technical Scientific Coordination (Coordinamento Tecnico Scientifico, COT) unit, Space Science Data Center (SSDC) group, sub-domain Earth Observation (EO).
- Responsible of contributing to the development of EO sensory data-derived value-added information products and processes, defined at the levels of abstraction of: (i) information processing system requirements specification, (ii) information/knowledge representation, (iii) system design (architecture), (iv) algorithm, (v) implementation, (vi) integration and (vi) quality assessment for testing and validation purposes, based on a minimally dependent and maximally informative (mDMI) set of outcome and process quantitative quality indicators (OP-Q2Is), selected in compliance with the FAIR criteria (Findable, Accessible, Interoperable, Reusable) to guarantee interoperability with national and international EO data and information access platforms, if any.

01/10/2016–30/10/2017

Senior scientist

Department of Geoinformatics – Z_GIS, University of Salzburg, Salzburg (Austria)

Funded project: Austrian Research Promotion Agency (FFG), project call "Proposals to ICT of the Future", project title: SemEO (Semantic enrichment of optical EO data to enhance spatio-temporal querying capabilities).

2-of-12 months overlapping with the 18-month PhD 2nd/3rd-year training period abroad, University of Naples Federico II, Department of Agricultural Sciences, Naples, Italy.

As follow-up of the funded FFG AutoSentinel-2/3 project (2015), the SemEO project aims at further developing the Earth Observation (EO) Image Understanding For Semantic Querying (EO-IU4SQ) system prototype, capable of automated near real-time generation of ESA EO Level 2 product from each single-date EO multi-spectral (MS) image stored in multi-source EO big image databases as necessary not sufficient pre-condition for semantic querying the database. Output products generated by the closed-loop EO-IU4SQ system monotonically increase their value-added with closed-loop iterations. An ESA EO Level 2 product is defined as a MS image corrected for geometric, atmospheric, adjacency and topographic effects, stacked with its data-derived scene classification map (SCM) whose land cover (LC) class legend is general-purpose, user- and application-independent and includes quality layers such as cloud and cloud-shadow. No ESA Level 2 product has ever been systematically generated at the ground segment to date. No semantic content-based image retrieval (SCBIR) system has ever been developed in operating mode by the remote sensing community either. Our working hypothesis was that existing content-based image retrieval (CBIR) systems support no semantic querying because they lack EO image understanding capabilities, required to transform EO sensory data into EO value-adding information products of symbolic quality. Our automated near- real-time ESA EO Level 2 product generator is input with multi-spectral (MS), super-spectral-spectral (SS) and hyper-spectral (HS) spaceborne images provided with radiometric calibration metadata, such as those acquired by Sentinel-2 MSI, Sentinel-3 OLCI and SLSTR, ENVISAT AATSR, ERS-2 ATSR-2, MSG, Landsat-4/5/7 TM, Landsat-8 OLI, ASTER, MODIS, SPOT-4/5/6/7, Pleiades-1A/B, DMC, FORMOSAT, RapidEye, IKONOS, QuickBird, WorldView-2/3/4, APEX,

AVIRIS, Hyperion, etc. For comparison purposes in terms of scalability to changes in sensor specifications, the Sentinel 2 Correction (Sen2Cor) Prototype Processor developed by ESA in collaboration with Telespazio VEGA, to be run on user side, is input with Sentinel-2 MSI imagery exclusively.

01/03/2016–01/07/2016

Visiting scientist

Computer Vision Center (CVC), Universidad Autonoma de Barcelona (UAB), Barcelona (Spain)

5 months overlapping with the 18-month PhD 2nd/3rd-year training period abroad, University of Naples Federico II, Department of Agricultural Sciences, Naples, Italy.

Objective: Survey of the state-of-the-art in deep convolutional neural network (DCNN) design and implementation issues, with special emphasis on autonomous driving vehicle control system applications. My interest in this application field of computer vision dates back to Jan. 2015, when I presented at Vision Lab (VisLab) srl, spinoff of the University of Parma, Italy, a critical analysis of existing publications co-authored by Prof. Alberto Broggi. General Manager at VisLab srl (acquired by Silicon-Valley company Ambarella Inc. on June 2015) and a professor of Computer Engineering at the University of Parma in Italy, Prof. Alberto Broggi has been pioneering the field of machine vision applied to driverless cars and unmanned vehicles in general. At CVC-UAB, I searched for further developments in DCNN design and implementation, such as: integration of inductive learning-from-data filter parameter selection with physical model-based wavelet filter banks consistent with pre-attentive visual perception (e.g., Mach band illusion in ramp-edge detection), foveated imaging where spatial filter resolution is eccentricity-dependent in combination with focus-of-visual-attention mechanisms for fixation point selection based on hybrid (deductive/top-down and inductive/bottom-up) inference.

01/07/2013–31/01/2016

Senior scientist

Department of Geoinformatics – Z_GIS, University of Salzburg, Salzburg (Austria)

- FP7-Space project G-SEXTANT (Consolidation of a standardized portfolio of Earth Observation products and pre-operational services in the frame of pre-defined scenarios), Role: Project collaborator.
- Austrian Research Promotion Agency (FFG) - Project call ASAP11, project title: AutoSentinel2/3 (Knowledge-based pre-classification of Sentinel-2/3 images for operational product generation and content-based image retrieval). Role: Co-leader.
  - The AutoSentinel2/3 project started the research & technological development of an innovative Earth Observation (EO) Image Understanding For Semantic Querying (EO-IU4SQ) system prototype, capable of automated near real-time generation of ESA EO Level 2 product from each single-date multi-spectral (MS) Sentinel-2 MSI and Sentinel-3 OLCI and SLSTR image stored in multi-source EO big image databases as necessary not sufficient pre-condition for semantic querying the database. No ESA Level 2 product has ever been systematically generated at the ground segment to date. No semantic content-based image retrieval (SCBIR) system has ever been developed in operating mode by the remote sensing community either. Also refer to the FFG follow-up project SemEO.
- 10 months overlapping with the 18-month PhD 2nd/3rd-year training period abroad, University of Naples Federico II, Department of Agricultural Sciences, Naples, Italy.

01/07/2013–01/07/2015

Adjunct Associate Professor

Dept. of Geographical Sciences, Univ. of Maryland, College Park (USA)

Co-supervision of one PhD student

01/02/2015–31/03/2015

PhD Fellowship

Ben Gurion University of the Negev, Sde Boker (Israel)

Fp7-Experimentationin Ecosystem Research (ExpeER) project. Title of the ExpeER project proposal: Prior Spectral Knowledge for Ecosystem Service Monitoring and Understanding (PriorSpecK4ECOS).

1 month overlapping with the 18-month PhD 2nd/3rd-year training period abroad, University of Naples Federico II, Department of Agricultural Sciences, Naples, Italy.

Objective: biophysical variable estimation, e.g., leaf area index and crop water requirement estimation, from spaceborne/airborne multi-spectral and hyper-spectral imagery.

01/02/2014–28/02/2014

Senior Scientist Fellowship

German Aerospace Center (DLR), Institute of Remote Sensing Technology, Oberpfaffenhofen (Germany)

German Academic Exchange Service (DAAD), Senior Scientist Fellowship titled: Advances in spaceborne image automatic near real-time pre-classification and segmentation

01/09/2010–30/06/2013

Research Associate Professor

Dept. of Geographical Sciences, Univ. of Maryland, College Park (USA)

NASA Land-Cover and Land-Use Change (LCLUC) Program, Automatic pre-classification and segmentation of the Landsat Web-Enabled Data set (WELD) at continental and global spatial extents

- Development of the Satellite Image Automatic Mapper (SIAM), a lightweight computer program eligible for use in mobile software applications and capable of automated near real-time hyperpolyhedralization of a multi-spectral (MS) reflectance space into MS color names, superpixel detection and vector quantization quality assessment in the image-domain (please, refer to my personal web page: siam.andreabaraldi.com). SIAM can be input with any MS, super-spectral (SS) or hyper-spectral image (HS) acquired by past, present or future imaging sensor radiometrically calibrated into top-of-atmosphere reflectance (TOARF) or surface reflectance (SURF) values. Hence, SIAM can map into MS color names automatically and in near real-time any spaceborne optical image acquired by MS, SS, or HS imaging sensors such as Sentinel-2 MSI, Sentinel-3 OLCI and SLSTR, ENVISAT AATSR, ERS-2 ATSR-2, MSG, Landsat-4/5/7 TM, Landsat-8 OLI, ASTER, MODIS, SPOT-4/5/6/7, Pleiades-1A/B, DMC, FORMOSAT, RapidEye, IKONOS, QuickBird, WorldView-2/3/4, APEX, AVIRIS, Hyperion, etc.
- Large-scale burned area product generation from Landsat image time-series, where SIAM provides automated near real-time single-date superpixel detection and color naming employed as input to a spatial context-sensitive decision tree for burned area classification through time.
- SIAM Stage 4 Validation by independent means at continental scale on an annual Web-Enabled Landsat data (WELD) image composite time series, in agreement with the Group on Earth Observations (GEO) Quality Assurance Framework for Earth Observation (QA4EO) calibration/validation (Cal/Val) requirements.

01/03/2009–30/11/2009

Scientific consultant

SARMAP, Purasca (Switzerland)

Development of the OpticalScape commercial software toolbox (never released)

01/02/2005–01/02/2009

Scientific officer

European Commission Joint Research Centre (EC-JRC), Ispra (VA) (Italy)

Affiliated to the Spatial Data Infrastructures (SDI) unit of the Institute for Environment and Sustainability (IES). Development of operational remote sensing image understanding systems for vegetation monitoring, cloud detection, flood detection, fire detection, urban area monitoring at either local (regional), continental or global scale.

01/08/2003–31/10/2004

Research associate

Institute of Intelligent Systems for Automation (ISSIA)-National Research Council (CNR), Bari (Italy)

FP6-LEWIS (Landslide Early-Warning Integrated System). Research and development in computer vision, pattern recognition and remote sensing image understanding.

01/06/2002–01/06/2003

Research associate

Institute of Intelligent Systems for Automation (ISSIA)-National Research Council (CNR),

Bari (Italy)

Research and development of context-sensitive neuro-fuzzy clustering algorithms for multi-source image analysis

01/05/2000–01/05/2002 **Post-doctoral researcher**

European Commission Joint Research Centre (EC-JRC), Ispra (VA) (Italy)

Affiliated to the Global Vegetation Monitoring (GVM) unit of the Institute for Environment and Sustainability (IES). Title of the research activity: "Development and validation of algorithms for the automatic thematic information extraction from wide area radar maps of forest ecosystems."

01/06/1999–01/04/2000 **Research associate**

Istituto di Scienze dell'Atmosfera e del Clima (ISAC)-National Research Council (CNR), Bologna (Italy)

Machine learning and computer vision applications to remote sensing images.

01/12/1997–01/06/1999 **Post-doctoral researcher**

International Computer Science Institute (ICSI), Berkeley (USA)

Affiliated to the Artificial Intelligence group led by Prof. J. Feldman, ICSI and UC Berkeley. Title of the research activity: "Scatter-partitioning neural networks for image segmentation."

01/03/1993–30/11/1997 **Research associate**

Istituto per lo studio delle Metodologie Geofisiche Ambientali (IMGA)-National Research Council (CNR), Modena (Italy)

Main research interests: low-level visual processing, with special regard to texture analysis, and neural network applications to unsupervised data quantization and unsupervised data clustering.

01/01/1991–31/03/1993 **Consultant**

European Space Agency (ESA)-ESRIN, Frascati (Italy)

Responsible of the quality assessment of commercial geographic information systems (GISs) and of the development of raster modules in vector-based GISs (e.g., System9).

01/06/1989–30/12/1990 **Military service: Lieutenant in the Technical Corp**

Istituto Geografico Militare, Firenze (Italy)

Responsible for the development of satellite image segmentation and classification algorithms to be integrated with GIS (MicroStation by Intergraph).

01/02/1989–26/05/1989 **Consultant**

CIOC-National Research Council (CNR), Bologna (Italy)

Responsible for the development of object-oriented geographic information representation models and for the assessment of Geographic Information Systems (MicroStation by Intergraph).

EDUCATION AND TRAINING

01/03/2014–28/02/2017 **PhD in Agriculture and Agribusiness**

University of Naples “Federico II”, Department of Agricultural Sciences, Naples (Italy)

PhD dissertation (defense held on 16/05/2017): Pre-processing, classification and semantic querying of large-scale Earth observation spaceborne/airborne/terrestrial image databases: Process and product innovations

- Image pre-processing

- Self-organizing color constancy applied to uncalibrated panchromatic and color images, such as those acquired by consumer-level cameras mounted in mobile devices, such as smartphones and tablets, and those dealt with by unmanned aerial vehicles (UAVs), e.g., in precision agriculture applications, and by autonomous driving vehicle control systems.
- Absolute radiometric calibration of digital numbers (DNs) into top-of-atmosphere reflectance (TOARF) values.
- Automated near real-time ESA EO Level 2 product generation where a multi-spectral (MS) image is radiometrically calibrated from TOARF into surface reflectance (SURF) values corrected for atmospheric, topographic and adjacency effects.

- Near-orthogonal image analysis (decomposition) and near lossless image synthesis (reconstruction) based on an original wavelet-based spatial filter bank of even-symmetric filters and Gaussian filters.
- Visual feature extraction, raw primal sketch in pre-attentive vision.
  - Color naming in radiometrically calibrated MS imagery. Satellite Image Automatic Mapper (SIAM): lightweight computer program eligible for use in mobile software applications and capable of automated near real-time MS reflectance space hyperpolyhedralization into a dictionary of MS color names, superpixel detection and vector quantization quality assessment in the image-domain.
  - Color naming in radiometrically uncalibrated RGB imagery, either true- or false-color, such as those acquired by consumer-level cameras mounted in mobile devices, such as smartphones and tablets, and those dealt with by UAVs, e.g., in precision agriculture applications, and by autonomous driving vehicle control systems. Color naming in radiometrically uncalibrated RGB imagery must be employed in series to a color constancy image-pre-processing. RGB Image Automatic Mapper (RGBIAM): lightweight computer program eligible for use in mobile software applications and capable of automated near real-time RGB data cube polyhedralization into a dictionary of RGB color names, superpixel detection and vector quantization quality assessment in the image-domain.
  - Well-posed (deterministic) two-pass connected-component multi-level image labeling algorithm in operating mode (including small run-time memory occupation).
  - Original automated near real-time post-classification change/no-change detection in MS image time-series: SIAM-based change/no-change detection of MS color names through time.
  - Image contour detection. Original automated multi-scale wavelet-based zero-crossing image-contour detection in either panchromatic or color images, consistent with human visual perception (e.g., Mach bands illusion).
  - Image segmentation. Original automated multi-scale wavelet-based zero-crossing image-segment detection in either panchromatic or color images, consistent with human visual perception (e.g., Mach bands illusion).
  - Keypoint detection. Original automated multi-scale wavelet-based keypoint detection (simulating end-stopped cells in human vision): end-point, corner, T-junction, X-junction.
  - Local shape descriptors. Original minimally dependent and maximally informative set of planar shape descriptors: scale-invariant roundness, elongatedness, straightness of boundaries, simple connectivity, rectangularity and convexity.
- Visual feature extraction, full primal sketch in pre-attentive vision.
  - Texture segmentation (perceptual spatial grouping of texels). Original automated multi-scale binary texture profile generation.
- Attentive vision (classification).
  - Automated near real-time ESA EO Level 2 product generation where a multi-spectral (MS) image, radiometrically calibrated from TOARF into surface reflectance (SURF) values for atmospheric, topographic and adjacency effects, is stacked with its scene classification map (SCM). The general-purpose, application- and user-independent SCM legend is implemented as the FAO Land Cover Classification System (LCCS) taxonomy at the 3-level 8-class Dichotomous Phase (DP), augmented with quality layers such as cloud and cloud-shadow.
  - High-level hybrid feedback modular system for convergence-of-visual-evidence, where visual information primitives are: color names, texture, local shape, inter-object spatial topological (e.g., adjacency, inclusion, etc.) and spatial non-topological (e.g., distance measure, angle measure)

relationships .

- Modeled world (world ontology, world model, mental world): conceptual Entity-Relationship (ER) model, graphically represented as a semantic network with entities as nodes and relationships as arcs between nodes, provided with an algebra for spatiotemporal ER and event modeling.
- Incremental learning in a closed-loop hybrid (combined deductive and inductive) inference system architecture. Research & development of the Earth Observation (EO) Image Understanding For Semantic Querying (EO-IU4SQ) system prototype, capable of automated near real-time generation of ESA EO Level 2 product from each single-date EO multi-spectral (MS) image stored in multi-source EO big image databases as necessary not sufficient pre-condition for semantic querying the database. Output products generated by the closed-loop EO-IU4SQ system monotonically increase their value-added with closed-loop iterations.

- Automated stratified (layered, masked, driven-by-prior-knowledge) estimation of biophysical canopy variables from EO optical imagery. (i) Automated stratified multivariate estimation of a leaf area index (LAI), alternative to the Clevers reflectance model for LAI estimation (CLAIR), whose input is a univariate Weighted Difference Vegetation Index (WDVI). (ii) Automated stratified multivariate estimation of crop water requirements, alternative to: (a) the empirical crop coefficient (Kc)-normalized difference vegetation index (NDVI) relationship for canopy evapotranspiration estimation in comparison with evapotranspiration of a reference canopy, and (b) the FAO-56 procedure for the semi-empirical estimation of canopy evapotranspiration from meteorological data and crop variables, such as LAI and surface albedo, estimated from EO data.
- Original perceptual visual quality metric (PVQM) between a test and a reference image-pair, consistent with human visual perception, e.g., consistent with the Mach bands illusion in ramp-edge detection.
- Outcome and process quantitative quality assessment.
  - SIAM Stage 4 Validation by independent means at continental scale on an annual Web-Enabled Landsat data (WELD) image composite time series, in agreement with the Group on Earth Observations (GEO) Quality Assurance Framework for Earth Observation (QA4EO) calibration/validation (Cal/Val) requirements.
  - Sentinel-2 10 m resolution ESA EO Level 2 product Stage 2 Validation in comparison with the European Environment Agency GIO Land High Resolution Layers (HRLs), 20 m resolution. National scale: Austria.
  - Cloud/cloud-shadow accuracy assessment in comparison with the GaoFen-1 image and reference dataset available online (http://sendimage.whu.edu.cn/en/mfc/).

01/06/1993–14/06/1994

1st Level Master in Software Engineering

University of Padoa and Purdue University, West Lafayette, Indiana, USA, Padova (Italy)

01/09/1982–01/02/1989

Laurea (MS) degree in Electronic Engineering

University of Bologna, Bologna (Italy)

Title of the Laurea thesis: Segmentation and classification of high resolution satellite images

PERSONAL SKILLS

Mother tongue(s): Italian

Foreign language(s)

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C2	C2	C2	C2
High School Diploma					

Levels: A1 and A2: Basic user - B1 and B2: Independent user - C1 and C2: Proficient user
Common European Framework of Reference for Languages

Communication skills

Experienced at working in a European and multicultural dimension. Excellent adaptability to new situations and environments. Excellent communication and writing skills.

Organisational / managerial skills

Extensive experience of participating in research projects, managing human resources and teaching.

Job-related skills

- Teaching and leadership capabilities.
- Scientific domains of expertise.
  - Software engineering.
  - Cognitive science. Cognitive science is the interdisciplinary scientific study of the mind and its processes. Mental faculties of concern to cognitive scientists include perception, language, memory, attention, reasoning, and emotion. Cognition is synonym of (biological) intelligence, learning, adaptation, self-organization. Multi-disciplinary cognitive science encompasses linguistics, philosophy, anthropology, neuroscience, psychophysics, artificial intelligence and machine learning. According to cybernetics an "artificial mind" (software) cannot be pursued independently of an "electronic brain" as its physical support (hardware). This "connectionist approach" is alternative to the "symbolic approach" promoted by traditional artificial intelligence where an artificial mind is investigated independently of its physical support.
  - Machine learning-from-data.
    - Supervised (labeled) data learning for classification and function regression, e.g., deep convolutional neural networks (DCNNs).
    - Unsupervised (unlabeled) data learning for density function estimation, vector quantization and unsupervised data clustering, including self-organizing topology preserving neural networks (TPNN) capable of: (i) generating/removing processing units dynamically and (ii) generating/removing lateral connections dynamically.
  - Artificial intelligence. Top-down (deductive) prior knowledge transfer from human-to-machine, typical of artificial intelligence, is required as initial condition by inherently ill-posed inductive data learning algorithms, typically investigated by machine learning, to become better conditioned for numerical solution. To take advantage of the unique features of each and overcome their shortcomings, top-down/deductive learning-by-rule subsystems (equivalent to genotype) and bottom-up/inductive learning-from-examples subsystems (equivalent to phenotype) are typically combined into hybrid inference systems.
    - Conceptual Entity-Relationship knowledge/information representation combined with state diagrams (finite state automata) to provide a mental model of the 4D spatiotemporal physical world, known as world model or geospatiotemporal ontology. Noteworthy, processes are nodes in flow charts corresponding to edges in state diagrams. In a semantic network, entities are nodes and relationships are arcs between nodes. A space-time world model consists of: (1) continuants, subdivided into (a) geo-objects (geospatial categorical variables provided with semantics), (b) geo-fields (geospatial numeric variables) and (c) field-objects (categorical variables as discretized geo-fields). (2) Occurrents, which means events/(end of) processes. An event is a change in state of a continuant. A continuant in the space-time real-world domain is described by attributes: (i) space (x, y, z), (ii) time t, (iii) numeric and categorical variables, e.g., appearance properties, and (iv) a (symbolic) theme, belonging to a finite and discrete vocabulary (codebook) of codewords in a geospatial ontology. A phenomenon is any ensemble of states and/or changes in state of one or more continuants observed in time while space or theme are either controlled or fixed.
    - Expert system design and development: fact base, knowledge base (first-principle models, rules and metarules), inference engine (provided with four types of logical reasoning: deduction, abduction, induction and transitivity), system requirements specification in user-speak by domain experts, statement of external functionalities in techno-speak by knowledge engineers.
  - Pattern (e.g., spectral signature) recognition, including (2D) planar shape descriptors.
  - Multiple source data fusion, e.g., optical and synthetic aperture radar (SAR) imagery fused at semi-symbolic or symbolic levels of abstraction, rather than at the sub-symbolic level of sensory data (observables).
  - Computer vision (computer-driven scene-from-image reconstruction and understanding) consistent with human visual perception (e.g., Mach bands illusion).

- Image pre-processing (enhancement) and feature extraction consistent with human vision, e.g., color constancy, color naming.
- Primary visual cortex mechanisms at the raw primal sketch (e.g., wavelet filter banks of even- and odd-symmetric spatial filters for zero-crossing image-contour detection, end-stopped cells for keypoint detection, automatic zero-crossing segment detection from zero-crossing image-contours) and full primal sketch (texture segmentation as perceptual spatial grouping of texels).
- Attentional vision, e.g., foveated imaging system in combination with a hybrid (combined deductive and inductive) focus-of-attention mechanism.

- Remote sensing.
  - Systematic ESA Level 2 product generation at the ground segment, encompassing a single-date multi-spectral (MS) image radiometrically calibrated into surface reflectance values corrected for atmospheric, topographic and adjacency effects, stacked with its general-purpose, user- and application-independent scene classification map (SCM).
  - Satellite Image Automatic Mapper (SIAM): proprietary lightweight computer program eligible for use in mobile software applications and capable of automated near real-time hyperpolyhedralization of a multi-spectral (MS) reflectance space into MS color names, superpixel detection and vector quantization quality assessment in the image-domain.
  - RGB Image Automatic Mapper (RGBIAM): proprietary lightweight computer program eligible for use in mobile software applications and capable of automated near real-time polyhedralization of an RGB cube into RGB color names, superpixel detection and vector quantization quality assessment in the image-domain
  - Self-organizing color constancy for uncalibrated color image harmonization through acquisition time, space and imaging sensors.
- Geographic Information Science (GIScience), capable of geospatial reasoning to answer questions such as: what, where and how/why? It deals with discrete geospatial objects (geo-objects) of semantic (symbolic), numeric variables (geo-fields) and discretized numeric variables of sub-symbolic quality (field-objects). In geographic information systems (GIS), geo-fields are raster numeric variables while geo-fields and field-objects are raster categorical variables eligible for vector data representation.

Digital skills

SELF-ASSESSMENT				
Information processing	Communication	Content creation	Safety	Problem solving
Proficient user	Proficient user	Proficient user	Basic user	Basic user

Digital skills - Self-assessment grid

Programming languages: C/C++, Fortran, Basic, Pascal, Prolog, MATLAB, IDL

Operating systems: MS Dos, Windows, Unix

Commercial image processing software toolboxes: ENVI by Research Systems Inc.

Commercial software toolboxes for data visualization, analysis and processing: MATLAB by the Math Works Inc, IDL by Research Systems Inc.

Geographic information systems: ArcGIS, ArcCatalog.

Other commercial software tools: MS Word, MS PowerPoint, MS Excel, MS Project, MS Explorer, MS Visual Studio.

Other skills

Teaching experience

- Sept. 12-13, 2016 Contributor to the GEOBIA 2016 Doctoral Colloquium, conceived for PhD students and recent postdocs, in collaboration with senior OBIA researchers from Z-GIS and ITC/the University of Twente, Enschede, the Netherlands, in the framework of the GEOBIA 2016 Conference, 14-16 September 2016 at ITC/the University of Twente, Enschede, the Netherlands.

- June 2-3, 2014 Workshop for Ph.D. and MS students – Hands on the Satellite Image Automatic Mapper™ software toolbox, In collaboration with Prof. Thomas Blaschke, Prof. Stefan Lang and Prof. Dirk Tiede, Department of Geoinformatics - Z_GIS, Integrated Spatial Analysis (ISA), University of Salzburg.
- March – May 2014 Visiting professor, University of Modena and Reggio E., Italy, Academic year in Electronic Engineering: 2013-1014, Teaching course (30 hours + testing) for M.S. and Ph.D. students in “Advanced Electronic Systems: Neuromorphic Engineering - Adaptive oxide electronics (memristors) for fabricating devices to mimic human brain functionalities". Hosting professor: Prof. P. Pavan.
- Feb. 2011 Teaching assistant in the Spring 2011 Geog778B course, titled "Remote Sensing for Global Carbon Monitoring," University of Maryland, Department of Geographical Sciences, Teaching Professor: Dr. L. Boschetti.
- Dec. 2003 Teaching assistant in "Tecniche avanzate di elaborazione dei segnali," corso di Laurea in Ingegneria e Telecomunicazioni, academic year 2003-2004, first semester, Univ. di Trento, Teaching Professor: Prof. L. Bruzzone.
- Dec. 2002 Teaching assistant in "Tecniche avanzate di elaborazione dei segnali," corso di Laurea in Ingegneria e Telecomunicazioni, academic year 2002-2003, first semester, Univ. di Trento, Teaching Professor: Prof. L. Bruzzone.

Participation in training (mentoring)

- 6 PhD students.
- 5 MS students.

Professional society activities

- Jan. 2001-May 2006. Associate editor of the IEEE Transactions on Neural Networks journal.
- Sep. 2012. Program Committee, Workshop at the GIScience conference, 18-20 September 2012, Columbus, Ohio: Geographic object based multi-scale analysis: Developing a methodological framework for GIScience.
- Sept. 28, 2015 (invited) European Commission - European Space Expo, Milan, Italy, 18 Sept. – 4 Oct. 2015: Food and Space. Andrea Baraldi, "Agricultural Applications of Airborne/Spaceborne Images – If You Don't Measure It, You Can't Improve It," University of Salzburg and University of Naples Federico II.

Refereeing

> 90 papers submitted for consideration for publication in IEEE Trans. Fuzzy Systems:5, IEEE Trans. Neural Networks: 43, IEEE Trans. Image Processing: 3, IEEE Trans. Knowledge and Data Engineering: 1, IEEE Trans. Systems, Man, and Cybernetics: 2, IEEE Trans. Geoscience and Remote Sensing: 26, IEEE Geoscience and Remote Sensing Letters: 2, Remote Sensing: 4.

Participation in European, international and national programmes

Institution of affiliation, Project Name and Identifier, Funded by, Duration, Own amount / Budget, Other partners

- ISSIA-CNR (WP Leader) Landslide Early-Warning Integrated System (LEWIS), EVG1-CT-2001-00055, EU-EC, 2002-2006, € 190.00 / ..., Univ. Bari (PI), Canada Centre of Remote Sensing (CCRS), Univ. of Surrey, Silogic, Planetek, Altamira.
- MEEO srl Italy (PI), Knowledge-centred Earth Observation (KEO) Extensions and Installations (KEI), ESA, 2007-2009, € 196.241, none.

- MEEO srl Italy (PI), Classification Application-services and Reference Datasets (CARD), Letter of Invitation n° RES-POE/2007/525/LG/cb, ESA, 2008-2010, € 265.720, none.
- MEEO srl Italy (PI), Support by Pre-classification to Specific Applications (SPA), Letter of Invitation n° RES-POE/2008/497/EC/sp, ESA, 2009-2011, € 469.903, none.
- MEEO srl Italy (WP Leader), Spatial Observation Services and Infrastructure (SOSI), Letter of Invitation n° RES-POE/2008/488/LG/cb, ESA, 2009, € 29.996 / ..., Siemens Austria (PI).
- MEEO srl Italy (PI), Support to the RoKEO PECS project (SRoKEO), Letter of Invitation n° RES-POE/2008/292/cb, ESA, 2009-2011, € 79.704 / ..., Romanian Space Agency.
- MEEO srl Italy (PI), Image Information Mining - Time Series (IIM-TS), ESA, 2009, € 13.576 / ..., Sarmap SA.
- Baraldi Consultancy in Remote Sensing (WP leader), BIOdiversity Multi-Source Monitoring System: from Space TO Species (BIO-SOS), FP7-SPACE-2010-1, EU-EC, 2010-2012, € 360.000 /..., ISSIA-CNR (PI), Alterra, IRD, Uni. of Bari, ATREE, Planetek, ICETA, Univ. Of Aberystwyth, ASI, Uni. of Milano-Bicocca.
- University of Maryland, Department of Geographical sciences (PI), National Aeronautics and Space Administration (NASA) Land-Cover and Land-Use Change (LCLUC) Program /.../ University of Maryland, University of South Dakota.
- Univ. Salzburg, Z-GIS (PI), ASAP11 project call, AutoSentinel2/3 project (Knowledge-based pre-classification of Sentinel-2/3 images for operational product generation and content-based image retrieval), ID 848009, FFG, 2015-2016, € 125.580.
- Univ. Salzburg, Z-GIS (PI), ICT of the Future project call, SemEO project (Semantic enrichment of optical EO data to enhance spatio-temporal querying capabilities), FFG, 2016-2017, € 128.947.

Professional references

- Prof. Franco Prodi, ISAC-CNR, Via P. Gobetti 101, Bologna 10129, Italy. Phone: +39-051-6399561, Email: f.prodi@isac.cnr.it
- Prof. and Chair Christophere Justice, 2181A LeFrak Hall, Department of Geographical Sciences, University of Maryland, College Park, MD 20742, USA. Phone: +1-301-4051600, Email: cjustice@umd.edu
- Dr. Alessandro Annoni, Head of the Spatial Data Infrastructures Unit, EC Joint Research Center, Via Fermi, Ispra (Varese), Italy. Phone: +39-0332-786166, Email: alessandro.annoni@jrc.ec.europa.eu
- Prof. Paolo Pavan, Engineering Department, University of Modena and Reggio Emilia, Italy. Phone: +39-059-2056158, Email: paolo.pavan@unimore.it
- Prof. Francesco Giannino, Department of Agricultural Sciences, University of Naples "Federico II", Via Università 100; 80055 PORTICI (Napoli), Italy. Phone: +39-081-2539424, Email: giannino@unina.it
- Dr. Virginia Puzzolo, European Commission Research Executive Agency, Covent Garden Place Rogier, 16 1049 Brussels Belgium, Email: virginia.puzzolo@ec.europa.eu
- Prof. Stefan Lang, Head Integrated Spatial Analysis (ISA), Interfaculty Department of Geoinformatics - Z_GIS, University of Salzburg, Schillerstr. 30, Building 15, 3rd Floor, 5020 Salzburg, Austria. Tel: +43 (0) 662-80447562, Email: stefan.lang@sbg.ac.at
- Prof. Thomas Blaschke, Deputy Director of the Interfaculty Department of Geoinformatics - Z_GIS, Integrated Spatial Analysis (ISA), University of Salzburg, Schillerstr. 30, 5020 Salzburg, Austria. . Tel: +43 (0) 662-80447525, Email: Thomas.Blaschke@sbg.ac.at
- Prof. Dirk Tiede, Interfaculty Department of Geoinformatics - Z_GIS, Integrated Spatial Analysis (ISA), University of Salzburg, Schillerstr. 30, 5020 Salzburg, Austria. Tel: +43 (0) 662-80447565, Email: dirk.tiede@sbg.ac.at

Driving licence B

ADDITIONAL INFORMATION

Publications

List of awards for work and publications

- Sept. 2015. Winner of the T-Systems Big Data Challenge of the Copernicus Masters 2015, with the project and feasibility study titled: "Satellite Image Automatic Mapper™ (SIAM™)-Through-Time (SIAMT^2) for spaceborne/ airborne multi-spectral image time-sequence classification in operating mode and content-based image database retrieval" (Project ID 150688)". Final project title: D. Tiede, A. Baraldi, M. Sudmanns, M. Belgiu, and S. Lang, "ImageQuerying (IQ): Off-the-shelf Image Content Extraction & Querying Across Time and Space". Awards Ceremony on Oct. 20, 2015 at the Satellite Masters Conference, 20-22 Oct. 2015, German Federal Ministry of Transport and Digital Infrastructure, Invalidenstraße 444, 10115 Berlin, Germany.
- May 2015, IGARSS 2015, Milan, Italy, 27-31 July 2015. IEEE GRSS Data Fusion Contest, paper “Geospatial 2D AND 3D object-based classification and 3D reconstruction of ISO-containers depicted in a LiDAR dataset and aerial imagery of a harbor", ranked 2nd best.

List of selected publications or working papers

[55] **A. Baraldi**, M. L. Humber, D. Tiede and S. Lang, “GEO-CEOS stage 4 validation of the Satellite Image Automatic Mapper lightweight computer program for ESA Earth observation Level 2 product generation – Part 1: Theory”, Cogent Geoscience, vol. 4, 2018. DOI: 10.1080/23312041.2018.1467357.

[54] **A. Baraldi**, M. L. Humber, D. Tiede and S. Lang, “GEO-CEOS stage 4 validation of the Satellite Image Automatic Mapper lightweight computer program for ESA Earth observation Level 2 product generation – Part 2: Validation”, Cogent Geoscience, vol. 4, 2018. DOI: 10.1080/23312041.2018.1467254.

[53] M. Sudmanns, D. Tiede, S. Lang and **A. Baraldi**, “Semantic and syntactic interoperability in online processing of big Earth observation data”, Int. J. of Digital Earth, vol. 11, no. 1, pp. 95-112, 2018. DOI: 10.1080/17538947.2017.1332112.

[52] **A. Baraldi**, D. Tiede, M. Sudmanns, and S. Lang, “Systematic ESA EO Level 2 product generation as pre-condition to semantic content-based image retrieval and information/knowledge discovery in EO image databases,” 2017 Conf. on Big Data From Space, BiDS’17, Toulouse, France, 28-30 March, 2017.

[51] D. Tiede, **A. Baraldi**, M Sudmanns, M. Belgiu and S. Lang, "Architecture and prototypical implementation of a semantic querying system for big earth observation image bases," European Journal of Remote Sensing, vol. 50, no. 1, pp. 452-463, Aug. 2017. DOI: 10.1080/22797254.2017.1357432.

[50] M. Sudmanns, D. Tiede, S. Lang and **A. Baraldi,** "Semantic and syntactic interoperability in online processing of big Earth observation data", Int. J. of Digital Earth, 31 May 2017. DOI: 10.1080/17538947.2017.1332112.

[49] **Andrea Baraldi**, Michael Laurence Humber, Dirk Tiede, Stefan Lang, "Stage 4 validation of the Satellite Image Automatic Mapper lightweight computer program for Earth observation Level 2 product generation, Part 1 Theory," Subjects: Computer Vision and Pattern Recognition (cs.CV), arXiv:1701.01930. Date: 8 Jan. 2017. [Online] Available: https://arxiv.org/ftp/arxiv/papers/1701/1701.01930.pdf

[48] **Andrea Baraldi**, Michael Laurence Humber, Dirk Tiede, Stefan Lang, "Stage 4 validation of the Satellite Image Automatic Mapper lightweight computer program for Earth observation Level 2 product generation, Part 2 Validation," Subjects: Computer Vision and Pattern Recognition (cs.CV), arXiv:1701.01932. Date: 8 Jan. 2017. [Online] Available: https://arxiv.org/ftp/arxiv/papers/1701/1701.01932.pdf

[47] **Andrea Baraldi**, Dirk Tiede, Stefan Lang, "Automated Linear-Time Detection and Quality Assessment of Superpixels in Uncalibrated True- or False-Color RGB Images," Subjects: Computer Vision and Pattern Recognition (cs.CV), arXiv:1701.01940. Date: 8 Jan. 2017. [Online] Available: https://arxiv.org/ftp/arxiv/papers/1701/1701.01940.pdf

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ANNEXES

- BaraldiSignature.jpg

europass

Language passport

Andrea Baraldi

Mother tongue(s)	Foreign language(s)
Italian	English

English

Self-assessment of language skills

UNDERSTANDING		SPEAKING		WRITING
Listening	Reading	Spoken interaction	Spoken production	Writing
C2 Proficient user	C2 Proficient user	C2 Proficient user	C2 Proficient user	C2 Proficient user

Certificates and diplomas

Title	Awarding body	Date	Level*
High School Diploma	Rex Putnam High School, Milwaukie, OR (USA)	01/07/1981	C2

Linguistic and intercultural experience

Description	Duration
Using languages at school and work: ▪ 1980-1981 AFS exchange student at Rex Putnam High School in Milwaukie, OR. ▪ 1997-1999. Post-doctoral researcher at the International Computer Science Institute (ICSI), Berkeley, CA (USA). ▪ 2010-2013. Research Associate Professor at the Univ. Maryland, College Park, MD.	–

Common European Framework of Reference for Languages - Self-assessment grid

		A1 Basic user	A2 Basic User	B1 Independent user	B2 Independent user	C1 Proficient user	C2 Proficient user
Understanding	Listening	I can understand familiar words and very basic phrases concerning myself, my family and immediate concrete surroundings when people speak slowly and clearly.	I can understand phrases and the highest frequency vocabulary related to areas of most immediate personal relevance (e.g. very basic personal and family information, shopping, local area, employment). I can catch the main point in short, clear, simple messages and announcements.	I can understand the main points of clear standard speech on familiar matters regularly encountered in work, school, leisure, etc. I can understand the main point of many radio or TV programmes on current affairs or topics of personal or professional interest when the delivery is relatively slow and clear.	I can understand extended speech and lectures and follow even complex lines of argument provided the topic is reasonably familiar. I can understand most TV news and current affairs programmes. I can understand the majority of films in standard dialect.	I can understand extended speech even when it is not clearly structured and when relationships are only implied and not signalled explicitly. I can understand television programmes and films without too much effort.	I have no difficulty in understanding any kind of spoken language, whether live or broadcast, even when delivered at fast native speed, provided I have some time to get familiar with the accent.
	Reading	I can understand familiar names, words and very simple sentences, for example on notices and posters or in catalogues.	I can read very short, simple texts. I can find specific, predictable information in simple everyday material such as advertisements, prospectuses, menus and timetables and I can understand short simple personal letters.	I can understand texts that consist mainly of high frequency everyday or job-related language. I can understand the description of events, feelings and wishes in personal letters.	I can read articles and reports concerned with contemporary problems in which the writers adopt particular attitudes or viewpoints. I can understand contemporary literary prose.	I can understand long and complex factual and literary texts, appreciating distinctions of style. I can understand specialised articles and longer technical instructions, even when they do not relate to my field.	I can read with ease virtually all forms of the written language, including abstract, structurally or linguistically complex texts such as manuals, specialised articles and literary works.
Speaking	Spoken interaction]	I can interact in a simple way provided the other person is prepared to repeat or rephrase things at a slower rate of speech and help me formulate what I'm trying to say. I can ask and answer simple questions in areas of immediate need or on very familiar topics.	I can communicate in simple and routine tasks requiring a simple and direct exchange of information on familiar topics and activities. I can handle very short social exchanges, even though I can't usually understand enough to keep the conversation going myself.	I can deal with most situations likely to arise whilst travelling in an area where the language is spoken. I can enter unprepared into conversation on topics that are familiar, of personal interest or pertinent to everyday life (e.g. family, hobbies, work, travel and current events).	I can interact with a degree of fluency and spontaneity that makes regular interaction with native speakers quite possible. I can take an active part in discussion in familiar contexts, accounting for and sustaining my views.	I can express myself fluently and spontaneously without much obvious searching for expressions. I can use language flexibly and effectively for social and professional purposes. I can formulate ideas and opinions with precision and relate my contribution skilfully to those of other speakers.	I can take part effortlessly in any conversation or discussion and have a good familiarity with idiomatic expressions and colloquialisms. I can express myself fluently and convey finer shades of meaning precisely. If I do have a problem I can backtrack and restructure around the difficulty so smoothly that other people are hardly aware of it.
	Spoken production	I can use simple phrases and sentences to describe where I live and people I know.	I can use a series of phrases and sentences to describe in simple terms my family and other people, living conditions, my educational background and my present or most recent job.	I can connect phrases in a simple way in order to describe experiences and events, my dreams, hopes and ambitions. I can briefly give reasons and explanations for opinions and plans. I can narrate a story or relate the plot of a book or film and describe my reactions.	I can present clear, detailed descriptions on a wide range of subjects related to my field of interest. I can explain a viewpoint on a topical issue giving the advantages and disadvantages of various options.	I can present clear, detailed descriptions of complex subjects integrating sub-themes, developing particular points and rounding off with an appropriate conclusion.	I can present a clear, smoothly-flowing description or argument in a style appropriate to the context and with an effective logical structure which helps the recipient to notice and remember significant points.
Writing	Writing	I can write a short, simple postcard, for example sending holiday greetings. I can fill in forms with personal details, for example entering my name, nationality and address on a hotel registration form.	I can write short, simple notes and messages. I can write a very simple personal letter, for example thanking someone for something.	I can write simple connected text on topics which are familiar or of personal interest. I can write personal letters describing experiences and impressions.	I can write clear, detailed text on a wide range of subjects related to my interests. I can write an essay or report, passing on information or giving reasons in support of or against a particular point of view. I can write letters highlighting the personal significance of events and experiences.	I can express myself in clear, well-structured text, expressing points of view at some length. I can write about complex subjects in a letter, an essay or a report, underlining what I consider to be the salient issues. I can select a style appropriate to the reader in mind.	I can write clear, smoothly-flowing text in an appropriate style. I can write complex letters, reports or articles which present a case with an effective logical structure which helps the recipient to notice and remember significant points. I can write summaries and reviews of professional or literary works.

arpae
agenzia prevenzione ambiente energia emilia-romagna

B

DICHIARAZIONE SOSTITUTIVA DI ATTO NOTORIO E DI CERTIFICAZIONE AI SENSI DEGLI ARTT. 46 E 47 DEL DPR n. 445/2000

PROCEDURA DI CONFERIMENTO DI INCARICO DI PRESTAZIONE D'OPERA INTELLETTUALE DI NATURA OCCASIONALE NELL'AMBITO DEL PROGETTO "18LET". ([1])

Il/la sottoscritto/a BARALDI ANDREA

sotto la propria responsabilità e consapevole di quanto disposto dall'art. 76 del DPR n. 445/2000 e dall'art. 495 del c.p. in caso di dichiarazioni mendaci,

DICHIARA

ai fini di quanto previsto dall'art. 1 c. 42 lett. h) della L. 190/2012

- che non è coniuge, convivente, né parente, nè affine fino al quarto grado compreso del soggetto conferente l'incarico in oggetto, del responsabile del procedimento in esame, nonchè del responsabile del progetto([2]);
- che non sussistono rapporti personali di debito/credito, rapporti personali di tipo economico, commerciale, professionale, finanziario con il soggetto conferente l'incarico in oggetto, con il responsabile del procedimento in esame, nonchè con il responsabile del progetto;
- che, per quanto di propria conoscenza, non presta attività a favore di soggetti sottoposti a procedure sanzionatorie da parte di Arpae o per le quali l'Agenzia svolge un ruolo istruttorio/autorizzatorio in procedimenti amministrativi;
- che non svolge attività in conflitto di interessi con le funzioni istituzionali di Arpae, avendo riguardo anche alle disposizioni di cui all'art. 7 del DPR n. 62/2013, applicabili per quanto compatibili con riferimento ai contenuti ed alla natura del contratto di lavoro autonomo in oggetto ([3]);
- che non sussiste alcuna delle condizioni di incompatibilità di cui all'art. 5 della Disciplina in materia di conferimento di incarichi di prestazione d'opera intellettuale, con contratti di lavoro autonomo presso Arpae Emilia-Romagna, approvata con DDG 130/2017.([4])
- che non è già lavoratore privato o pubblico collocato in quiescenza (art. 5 c. 9 del DL 95/2012 convertito nella L. 135/2012 e successive modifiche con L. 114/2014 e L. 124/2015).

---

1 La presente dichiarazione sarà pubblicata sul sito web istituzionale di Arpae, in caso di conferimento dell'incarico in esame al soggetto sottoscrivente.

2 Soggetto conferente l'incarico è la dott.ssa Tiziana Paccagnella; Responsabile del Procedimento è il dott. Lucio Botarelli; Responsabile di progetto è il dott. Lucio Botarelli.

3 Vedi Allegato 1) - art. 7 del DPR 62/2013.

4 Vedi Allegato 1) - estratto della Disciplina approvata con DDG 130/2017.

DICHIARA ALTRESI'

ai fini di quanto previsto dall'art. 15 c. 1 lett. c) del d. lgs. 33/2013

(barrare la casella)

☒ che non svolge incarichi e/o non ha la titolarità di cariche in enti di diritto privato regolati o finanziati dalla Pubblica Amministrazione e/o non svolge attività professionali;

☐ che svolge incarichi e/o ha la titolarità di cariche in enti di diritto privato regolati o finanziati dalla Pubblica Amministrazione e/o svolge attività professionali, e precisamente:
(riportare gli incarichi e/o le cariche in enti di diritto privato regolati o finanziati da PA e/o attività professionali)

- incarico/carica di: _____;
- a favore dell'ente: _____;
- attività professionale di: _____;
- a favore di: _____;

Modena lì 2 Agosto 2019

DOCUMENTO FIRMATO

La presente istanza deve essere sottoscritta dall'interessato in presenza del dipendente addetto ovvero sottoscritta e presentata unitamente a copia fotostatica non autenticata di un documento di identità del sottoscrittore (art. 38 D.P.R. n. 445/2000).

Spazio riservato all'ufficio ricevente, da utilizzare in alternativa all'invio della copia fotostatica del documento di identità.

Certifico apposta, in mia presenza, la firma del dichiarante. Il dipendente addetto _____

PGSIM/2018/
Bologna,

Gent.mo
Ing. Andrea Baraldi

TP\ls

Oggetto: Contratto per prestazione occasionale

Con la presente Le assegniamo il presente incarico occasionale alle seguenti principali condizioni:

1. Oggetto

Forma oggetto del presente incarico l'attività di:

- analisi delle migliori pratiche e procedure per la generazione automatica di prodotti e servizi informativi operativi, in tempo reale e per fini molteplici, generabili da immagini di osservazione della Terra acquisite principalmente da sensori ottici satellitari.

Nell'espletamento dell'incarico che Le viene conferito, ferma restando la Sua piena autonomia, Ella terrà conto delle nostre indicazioni al fine di coordinare la Sua attività con i programmi stabiliti dall'Agenzia.
Le attività oggetto del presente incarico dovranno essere espletate nel rispetto delle disposizioni di cui al DPR n. 62/2013 (Codice di comportamento dei dipendenti pubblici) e delle disposizioni di cui al Codice di comportamento aziendale di Arpae Emilia-Romagna, applicabili per quanto compatibili con il presente contratto di lavoro autonomo.

2. Impegno personale

Per lo svolgimento di quanto indicato al punto 1., Lei assicurerà un puntuale e corretto espletamento delle attività previste, senza alcun vincolo di orario.

3. Durata

Le attività di cui al punto1) saranno espletate entro il 31/12/2018.

4. Condizioni economiche

Per lo svolgimento delle attività di cui al punto 1. Le verrà riconosciuto un compenso forfetario lordo di **euro 4.900,00,** comprensivo di tutte le spese relative allo svolgimento del presente incarico occasionale, che viene da Lei accettato senza riserva alcuna.

Prendiamo atto della Sua dichiarazione, sotto la Sua unica responsabilità, che le prestazioni oggetto del nostro accordo sono di natura occasionale e sono quindi escluse dal campo di applicazione dell'I.V.A.

5. Pagamenti

L'importo a Lei dovuto sarà assoggettato a ritenuta d'acconto obbligatoria pari al 20% (venti percento), che verrà operata, al pagamento, sul valore lordo totale per il quale ci verrà rilasciata la ricevuta (notula) in cui dovrà essere riportato il numero dell'atto di conferimento dell'incarico di natura occasionale in oggetto.

Tale ricevuta, completa di bollo se dovuto, dovrà essere intestata a:

Arpae Emilia-Romagna, sede legale Via Po, 5 – 40139 Bologna. C.F. e P.IVA: 04290860370

La ricevuta dovrà essere trasmessa esclusivamente a mezzo posta elettronica al seguente indirizzo pec: **workflow_amm@cert.arpa.emr.it**

Arpae provvederà ai pagamenti entro 30 giorni dalla data di ricevimento della ricevuta.

Lei si impegna a comunicare ad Arpae eventuali modifiche al Suo regime fiscale che dovessero intercorrere tra il momento dell'emissione della ricevuta (notula) e il momento della liquidazione della stessa da parte della scrivente Amministrazione.

Lei si impegna, altresì, a comunicare ad Arpae, prima della corresponsione del compenso pattuito, l'eventuale superamento del limite di esenzione dalla contribuzione INPS, pari a 5.000,00 euro lordi annui (anno solare).

6. Recesso

L'eventuale rinuncia all'incarico da parte Sua o l'eventuale revoca da parte nostra dell'incarico conferitoLe dovrà essere notificata, da una parte all'altra, con un preavviso di almeno 7 giorni.

Le verrà compensata comunque solo l'attività da Lei effettivamente svolta fino a quel momento.

In caso di violazione delle disposizioni di cui al DPR n. 62/2013 (Codice di comportamento dei dipendenti pubblici) e/o delle disposizioni di cui al Codice di comportamento aziendale di Arpae Emilia-Romagna, applicabili - per quanto compatibili - alla prestazione oggetto del presente incarico, si prevede la possibilità per Arpae di risolvere anticipatamente il presente contratto di prestazione occasionale, nel rispetto dei principi di gradualità e proporzionalità.

7. Impegno di riservatezza

Lei è tenuto/a al più assoluto riserbo sui dati e sulle informazioni di cui venisse a conoscenza durante l'esecuzione dell'attività di cui all'oggetto.

E' vietata la riproduzione di qualsiasi documento.

Lei si impegna, inoltre, a mantenere riservate e a non divulgare a terzi tutte le informazioni trasmesseLe nell'ambito del presente incarico.

8) Trattamento dei dati personali

Arpae in relazione alla raccolta dei dati personali del collaboratore, effettuata in occasione della sottoscrizione del presente contratto, si impegna a rispettare quanto previsto dal D. Lgs. n.

196/2003. Si allega al presente contratto l'informativa prevista dall'art. 13 del sopra citato Decreto Legislativo.

9) Controversie

Per qualunque controversia dovesse insorgere nell'interpretazione e nell'esecuzione del presente contratto il foro esclusivamente competente è quello di Bologna.

10) Clausole finali

Il presente contratto formalizza la totalità degli accordi tra le parti. Qualsiasi modificazione o correzione dovrà essere preventivamente concordata per iscritto.

La prestazione richiesta, sia per le sue specifiche caratteristiche (nessun vincolo gerarchico, nessuna predisposizione di direttive attinenti l'intrinseco svolgimento dell'attività, nessun obbligo di orario di lavoro), sia perché così voluto e dichiarato dalle parti, non comporta alcun rapporto di lavoro subordinato.

L'Ente resta sollevato da ogni e qualsiasi responsabilità derivante dall'espletamento dell'incarico.

Il presente contratto è soggetto a registrazione in caso d'uso a cura e spese della parte richiedente.

In ottemperanza a quanto previsto dall'art. 17 del DPR n. 62/2013, si allega al presente contratto copia dello stesso DPR n. 62/2013 (Codice di comportamento dei dipendenti pubblici). Si allega, altresì, al presente contratto, il Codice di comportamento aziendale di Arpae Emilia-Romagna, in ottemperanza a quanto previsto dall'art. 14 c. 6 dello stesso Codice. I suddetti documenti sono consultabili anche sul sito web di Arpae, nella Sezione "Amministrazione Trasparente", sottosezione "Disposizioni Generali- Atti Generali".

L'incaricato è, altresì, informato che sul sito web di Arpae, nella Sezione "Amministrazione Trasparente", sottosezione "Anticorruzione", è pubblicato il *Piano triennale per la prevenzione della Corruzione*.

Nel formularLe i migliori auguri di una proficua collaborazione La preghiamo, ove d'accordo con il contenuto del contratto, di restituire all'Ente copia della presente da Lei sottoscritta, pagina per pagina, per integrale accettazione e conferma del contenuto del contratto medesimo, nonché dei relativi allegati.

Distinti saluti.

IL DIRETTORE
Servizio Idro-Meteo-Clima
Arpae Emilia-Romagna
- Dott.ssa Tiziana Paccagnella –

Allegati:

1) Informativa sulla privacy ex art. 13 D.lgs. 196/2003;

2) DPR n. 62/2013 (Codice di comportamento dei dipendenti pubblici), reperibile al seguente link: https://www.arpae.it/cms3/documenti/_cerca_doc/amministrativi/Codice_comportamento_DPR62_2013.pdf ;

3) Codice di Comportamento aziendale di Arpae Emilia-Romagna, reperibile al seguente link: https://www.arpae.it/cms3/documenti/_cerca_doc/trasparenza/personale/Codice_aziendale_2017_pubblicato.pdf .

Per accettazione

Il professionista
Ing. Andrea Baraldi

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Ai sensi dell'art. 1341 e 1342 C.C. si intendono specificatamente approvate le disposizioni contenute negli artt.:

6. Recesso
7. Impegno di riservatezza
8. Trattamento dei dati personali
9. Controversie
10. Clausole finali

Per accettazione

Il professionista
Ing. Andrea Baraldi

.....

Informativa sul trattamento dei dati personali ai sensi del Regolamento (UE) 2016/679 (RGPD)

Arpae Emilia-Romagna, in qualità di titolare del trattamento dei dati personali (con sede in Via Po 5, 40139 Bologna, dirgen@cert.arpa.emr.it - Centralino 051- 6223811), tratterà i dati personali conferiti con modalità prevalentemente informatiche e telematiche, per le finalità previste dal Regolamento (UE) 2016/679 (RGPD), in particolare per l'esecuzione dei propri compiti di interesse pubblico o comunque connessi all'esercizio dei propri pubblici poteri, ivi incluse le finalità di archiviazione, di ricerca storica e di analisi per scopi statistici.

I dati saranno trattati per tutto il tempo di durata del procedimento amministrativo o della attività tecnica di Arpae che la riguarda e successivamente saranno mantenuti in conformità alle norme sulla conservazione della documentazione amministrativa.

I dati saranno trattati esclusivamente dal personale e da collaboratori di Arpae Emilia-Romagna o dalle imprese espressamente nominate come responsabili esterni del trattamento. Al di fuori di queste ipotesi i dati non saranno comunicati a terzi né diffusi, se non nei casi specificamente consentiti dall'interessato o previsti dal diritto nazionale o dell'Unione Europea.

Gli interessati hanno il diritto di chiedere al titolare del trattamento l'accesso ai propri dati personali, la rettifica o la cancellazione degli stessi, la limitazione del trattamento che li riguarda o di opporsi al trattamento (artt. 15 e ss. del RGPD). L'apposita istanza ad Arpae è presentata contattando il DPO (Responsabile della Protezione dei Dati) all'indirizzo dpo@arpae.it presso Arpae.

Gli interessati, ricorrendone i presupposti, hanno, altresì, il diritto di proporre reclamo secondo le procedure previste dagli artt. 77 e ss. del RGPD.

N. Proposta: PDTD-2018-772 del 27/09/2018

Centro di Responsabilità: Servizio Idro-Meteo-Clima

OGGETTO: Servizio Idro Meteo Clima. Conferimento incarico di prestazione d'opera intellettuale di natura occasionale all'ing. Andrea Baraldi.

PARERE CONTABILE

Il/La sottoscritto/a Dott/Dott.ssa Ranieri Daniela, Responsabile Amministrativo/a di Servizio Idro-Meteo-Clima, esprime parere di regolarità contabile ai sensi del Regolamento Arpae sul Decentramento amministrativo.

Data 01/10/2018

Il/La Responsabile Amministrativo/a