Bernat Puigdomènech Treserras

Contact Information

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Interests

Research in atmospheric sciences (Numerical Weather Prediction, ground-based and space-borne radars), data visualization software and development of operational applications.

Education

Polytechnic University of Catalonia, Barcelona, Spain   2009

Superior Computer Engineering

- B.S. in Computer Engineering (180 ECTS) followed by a 2 year Software Engineering specialization (120 ECTS)
- Thesis: Profilers, software for meteorological data analysis and visualization. Advised by Professors Isztar Zawadzki and Juan José Costa Prats

École de Technologie Supérieure (ÉTS), Montréal, Canada   2007 - 2008

Student exchange program completing courses for the final year of degree

Work Experience

J.S. Marshall Radar Observatory, McGill University, Montréal, CANADA

Research Assistant   Jul 2012 - Current

- Assistance to the research activities of the McGill radar group
- Software development
- Operational maintenance of the group's systems and data repositories

Professional Associate   Nov 2009 - Jun 2010

- Development of analysis and visualization software

Software Developer   Sep 2007 - Aug 2008

- Thesis development under the supervision of Professor Isztar Zawadzki

Applied Hydrometeorology Research Center (CRAHI), Barcelona, SPAIN

Software Developer   Sep 2008 - Oct 2009

- Designing and developing software for the Ministry of the Environment of Andalusia (Junta de Andalucía)

Software Developer Intern   Oct 2006 - Jul 2007

- Developing software for the Meteorological Service of Catalonia (MeteoCat) and the Catalan Agency of Water (ACA)

Publications

On the climatological use of radar data composites: Possibilities and challenges
    Fabry F., Meunier V., Puigdomènech B., Cournoyer A. and Nelson B.
    (Submitted on 2016)

Conferences

Predictability and nowcasting of precipitation using a weather radar attractor
    Foresti, L., Sidérais I.V., Nerini D., Germann U., Puigdomènech, B., Atencia A. and Zawadzki I.
    Weather Radar and Hydrology, Seoul (Korea), 10-13th Apr 2017

Radar data visualization
    Puigdomènech, B.
    2016 DOE ARM/ASR Radar Workshop, Miami (USA). 2-5th May 2016

Why do we seek help from "big data" in nowcasting of precipitation?
    Zawadzki I., Atencia A., Surcel M. and Puigdomènech, B.
    Big Data and the Environment Workshop, Buenos Aires (Argentina), Nov 2015

Toward an Attractor of Radar Precipitation Data
    Atencia A., Puigdomènech, B. and Zawadzki I.
    37th Conference on Radar Meteorology, Norman (USA). 13-18th Sep 2015

A climatology of mesoscale motions of precipitation patterns
    Zawadzki I. and Puigdomènech B.
    8th European Conference on radar in Meteorology and Hydrology, Germany, 1-5th Sep 2014

Ensemble retrievals of rain parameters from radar measurements
    Zawadzki I. and Puigdomènech B.
    CMOS/AMS Congress, Montréal (Canada). 29-1st Jun 2012

Ensemble retrievals
    Zawadzki I. and Puigdomènech B.
    7th European Conference on radar in Meteorology and Hydrology, Toulose (France). Jun 2012

Skill of Nowcasting of precipitation by NWP and by lagrangian persistence
    Zawadzki I., Germann U., Lee, G., Berenguer M., Kilambi A., Surcel M. and Puidomènech B.
    NCAR Workshop, Oct 2012

Software

Profilers   Specialized software to analyze and visualize data from several meteorological
                 instruments and numerical weather prediction models; McGill S, X and W- band radars,

POSS, Parsivel and Thies disdrometers, WRF and MAS data, MAPLE nowcasts, etc.

MeteosViss   Portable version of Profilers adapted to visualize data from the C-band weather radar network of MeteoSwiss.

IDLCpuPM   Open Source library for parallel processing under IDL
               https://github.com/bernatp3rs/idl_cpu_pm/wiki

radar.mcgill.ca JS Marshall Radar Observatory website

Software Contributions

SIGMA   Specialized Geographic Information System (GIS) customized to analyze and visualize meteorological information (radar, satellite, ground-based sensors and NWP data)

GenRad   Generation of processed products from the MeteoSat satellite and the MM5 model

HydroVis   Interactive hydrological flood detection system based on weather radar data

MAPLE   Code refactoring, operational display and improvement of the operational Mcgill Algorithm for Precipitation nowcasting by Lagrangian Extrapolation

Others Contributions

David's Fanning book "Coyote's Guide to Traditional IDL graphics" and its related package of resources "Coyote Library"

Research Projects

- Development of a satellite simulator suitable for model validation and data assimilation
- Evaluation of the NASA GPM Dual-Frequency Precipitation Radar data for precipitation studies
- Probabilistic nowcasting of precipitation using "Analogues"
- Rainfall attractors and predictability
- Study of the contamination of radar data by windmills and other ground echoes
- Development of a ground-based radar simulator for model validation, data assimilation and radar data quality
- Contributions on the development of the Mesoscale Analysis System (MAS)
- Attenuation correction and calibration of the Parana C-band weather radar (Argentina)
- Evaluation of attenuation correction techniques using C-band simulated reflectivity
- Ensemble retrievals of rain parameters from radar measurements
- Radar reflectivity calibration from differential phase measurements
- Study of the scale-dependent performance of the Velocity Echo Tracking (VET) algorithm
- Improving the performance of VET during snow lake effect events
- Post-processing model-predicted rainfall fields in the spectral domain using phase information from radar observations

- Study of a precipitation nowcasting algorithm based on phase information from radar observations
- Evaluation of the MAPLE and WRF optimum forecast blending technique
- Evaluation of various techniques to produce a better radar Constant Altitude Plan Position Indicator
- Exploration of the time-space 3D autocorrelation function of reflectivity radar data

Technical Skills

Programming	IDL, Java, C, C++, Fortran, Python, bash scripting Parallel programming OpenMP and MPI
Web Technologies	HTML + Javascript, PHP, CMS (WordPress, Joomla)
Data Bases	Exist, SQL
Computer Applications	Eclipse, Rational Rose, ArcGIS, Illustrator and most common productivity packages
Operating Systems	Microsoft Windows family, Apple OS X and GNU/Linux

Excellent teamwork skills, and ability to learn new programming languages and/or technologies

Awards

Caja Madrid Fellowship   2007 - 2008

Awarded with the Caja Madrid Graduate Fellowship Exchange Program

Others

Languages	Catalan, Spanish, French, Portuguese and English
Citizenship	Spanish, Canadian