Andrea Pinna

Education

- Ph.D. in Electronic and Computer Engineering from the University of Cagliari, 2014.
  - Thesis: *Simulation and identification of gene regulatory networks*.
- Master's Degree in Electronic Engineering [108/110] from the University of Cagliari, 2008.
  - Erasmus scholarship for a 6-month research project at the Technical University of Delft, 2007.
  - Thesis: *Modeling, calibration and validation of highway traffic networks*.
- Bachelor's Degree in Electronic Engineering [107/110] from the University of Cagliari, 2005.
  - Thesis: *Parametric identification of hybrid systems*.
- Certificates of attendance and proficiency issued by *Centro Linguistico d'Ateneo* of the University of Cagliari:
  - English Intermediate II (B2), 2005.
  - English Post-Intermediate I (C1), 2006.
  - English preparation course to TOEFL certification, 2008.

Employment

May 2019 → Today: scientific programmer for the *Smart Energy Systems* group at *CRS4*; development of machine learning applications for the prediction of power load consumptions, management of time series and GIS databases, development of software for analysing and manipulating GIS data, development of a web-based decision-support application for the design of smart grid networks.

September 2019 → December 2019: scientific programmer at the *Department of Electronic and Electric Engineering at the University of Cagliari*; development of software for the analysis of synchrophasors from PMU devices.

January 2019 → May 2019: scientific programmer for the *Metrology* group at the *Astronomical Observatory of Cagliari, INAF*; development of out-of-focus holography software for estimating the deformations of the Sardinia Radio Telescope active surface.

May 2016 → December 2018: researcher and scientific programmer for the *Imaging and Numerical Geophysics* group at *CRS4*; parallelization of software for solving spectral element method problems; study and development of meta-schedulers aimed at the management of HPC software for the modeling of seismic wave propagation and for the identification of media crossed by seismic waves.

September 2015 → May 2016: researcher and scientific programmer at the *Department of Civil and Environmental Engineering and Architecture, University of Cagliari*; design and implementation of a WebGIS system for the analysis of tropospheric delay and integrated water vapour measurements, and the visualization of precipitation forecasts.

December 2014 → August 2015: researcher and scientific programmer at the *Department of Civil and Environmental Engineering and Architecture, University of Cagliari*; study and implementation of a simulation software to investigate photogrammetry approaches for measuring the deformations of the Sardinia Radio Telescope active surface.

June 2009 → December 2014: researcher and scientific programmer for the *Bioinformatics* group at *CRS4*; study, development and implementation of mathematical models, algorithms, methodologies and automated pipelines in computational biology and bioinformatics.

July 2008 → May 2009: researcher at the *Department of Chemical Engineering and Materials, University of Cagliari*; modeling, optimization and statistical analysis of bio-slurry treatment processes.

November 2007 → March 2008: apprentice at *Siemens AG, Corporate Technology Materials and Microsystems, Erlangen (Germany)*; development and characterization of organic semiconductor devices in clean room.

Expertise

- Multi-year experience in the design and development of scientific software in Linux/UNIX environments.
- Proficiency in scientific programming and software development with Python 2 and Python 3, MATLAB and Fortran languages.
- Proficiency with Bash scripting.
- Programming experience with R, C and MPI languages.
- Development of meta-schedulers for the management of complex computational pipelines in HPC clusters in the field of numerical geophysics.
- In-depth knowledge of PBS/TORQUE and OGS/GE distributed resource managers.
- Experience with the version control system software Git and with bug-tracking and project management tools like Trac, Redmine, Request Tracker and Trello.
- Development and implementation of:
  - mathematical models for the simulation of physical and biological systems,
  - reverse-engineering methodologies,
  - serial and parallel algorithms for solving numerically demanding problems.
- Experience in the design of MySQL, PostgreSQL and InfluxDB databases.
- Experience in the development of web applications with the Flask, Django and Streamlit frameworks.
- Experience in the development of WebGIS systems with raster and vector data.
- Simulation of image coordinates of 3D objects according to the synthetic optical characteristics of cameras and their viewpoints.
- Experience with bundle adjustment software for photogrammetry: MicMac and AICON 3D Studio.
- Development of computational pipelines for the distributed processing and management of high-throughput biological data within HPC clusters.
- Implementation of bioinformatics tools and workflows for the Galaxy computational framework.
- Publication of synthetic systems genetics datasets, released to the international research community as benchmarks for the evaluation and enhancement of algorithms to reverse-engineering gene networks.
- Operative participation in international research projects (e.g. with Osservatorio Astronomico di Cagliari, Virginia Bioinformatics Institute and Max Planck Institute) and consortia (e.g. DREAM, StatSeq, SeqAhead).
- Writing and organization of scientific papers and technical documentation; layout editing and manuscript formatting for the journal CAIM; proficiency in LaTeX.
- Teaching support in courses of NGS data analysis with Galaxy; private teaching in scientific subjects.
- Strong analytical skills combined with conceptual thinking and structured working style.
- Excellent discipline, multitasking and organizational abilities to rigorously manage individual and team activities.

Publications

- F. Buffa, G. Serra, S. Poppi, E. Egron, M. Murgia, A. Pinna. *Out-of-focus holography at the Sardinia Radio Telescope.* Proceedings of SPIE Ground-based and Airborne Telescopes VIII (2020).
- A. Pinna, L. Massidda. *A procedure for complete census estimation of rooftop photovoltaic potential in urban areas.* Smart Cities (2020).
- F. Buffa, A. Pinna, G. Sanna. *A simulation tool assisting the design of a close range photogrammetry system for the Sardinia Radio Telescope.* ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences (2016).
- L. Livi, E. Maiorino, A. Pinna, A. Sadeghian, A. Rizzi, A. Giuliani. *Analysis of heat kernel highlights the strongly modular and heat-preserving structure of proteins.* Physica A: Statistical Mechanics and its Applications (2016).
- G. Cuccuru, S. Leo, L. Lianas, M. Muggiri, A. Pinna, et al. *An automated infrastructure to support high-throughput bioinformatics.* Proceedings of the High Performance Computing & Simulation Conference (2014).
- G. Cuccuru, M. Orsini, A. Pinna, A. Sbardellati, et al. *Orione, a web-based framework for NGS analysis in microbiology.* Bioinformatics (2014).
- P. Meyer, T. Cokelaer, J. Saez-Rodriguez, A. Pinna*, et al. *Network topology and parameter estimation: from experiments to gene regulatory network kinetics using a community based approach.* BMC Systems Biology (2014).
- A. Pinna, N. Soranzo, A. de la Fuente, I. Hoeschele. *Simulation of the benchmark datasets.* Contributed chapter for the book *Gene network inference – verification methods from Systems Genetics data*, Springer (2013).
- A. Pinna, S. Heise, R.J. Flassig, A. de la Fuente, S. Klamt. *Reconstruction of large-scale regulatory networks based on perturbation graphs and transitive reduction: improved methods and their performance.* BMC Systems Biology (2013).
- D. Marbach, J.C. Costello, R. Küffner, G. Stolovitzky, A. Pinna**, et al. *Wisdom of crowds for robust gene network inference.* Nature Methods (2012).
- A. Pinna, N. Soranzo, I. Hoeschele, A. de la Fuente. *Simulating systems genetics data with SysGenSIM.* Bioinformatics (2011).
- A. Pinna, N. Soranzo, A. de la Fuente. *From knockouts to networks: establishing direct cause-effect relationships through graph analysis.* PLoS ONE (2010).
- A. Pinna, A. Lallai, G. Mura, M. Grosso. *Comparison across different models for the description of batch degradation processes.* Chemical Engineering Transactions (2009).

* As a member of the DREAM6 Consortium.
** As a member of the DREAM5 Consortium.

Technical Reports

- F. Buffa, A. Pinna, S. Poppi, M. Murgia, G. Serra. *Out-of-focus holography tool for the Sardinia Radio Telescope*, INAF Technical Reports, 2020.
- A. Pinna, N. Soranzo, I. Hoeschele, A. de la Fuente. *SysGenSIM (release 1.1)*, 2013.
- A. Pinna, N. Soranzo, I. Hoeschele, A. de la Fuente. *StatSeq Systems Genetics benchmark*, 2012.
- M. Orsini, G. Cuccuru, P. Uva, V. De Leo, A. Pinna, A. Sbardellati, N. Soranzo, A. Travaglione, G. Fotia. *A course in Next Generation Sequencing data analysis using Galaxy*, 2012.

Poster Presentations

- A. Pinna, N. Soranzo, I. Hoeschele, A. de la Fuente. *Simulating Systems Genetics with SysGenSIM*. StatSeq Gene Network Inference Meeting, Paris, March 2013.
- A. Pinna, N. Soranzo, C. Seatzu, A. de la Fuente. *Structural identification of gene regulatory networks from gene expression datasets*. DISC School on Control of Discrete-Event Systems, Cagliari, June 2011.
- A. Pinna, N. Soranzo, V. De Leo, A. de la Fuente. *Elucidating transcriptional regulatory networks from heterogeneous gene expression compendia*. FEBS-SystemsX-SysBio2011: from molecules to function, Innsbruck, February 2011.
- A. Pinna, N. Soranzo, I. Hoeschele, A. de la Fuente. *SysGenSIM, simulating large systems genetics datasets for the evaluation of analysis methods (updated)*. Conference on Research in Computational Molecular Biology, Lisbon, August 2010, and Conference on Computational Methods in Systems Biology, Trento, September 2010.
- A. Pinna, I. Hoeschele, A. de la Fuente. *SysGenSIM, simulating larger systems genetics datasets for the evaluation of analysis methods*. Symposium on Systems Genetics, Groningen, October 2009.

Scientific Software

- `shadow-mapper`, an application for computing, given an elevation raster, which pixels of the surface are lit by the sun and which are in shade at a certain time, available at `https://github.com/pinno/shadow-mapper`.
- `pyoof-srt`, a software for performing out-of-focus holography on astronomical beam maps for the Sardinia Radio Telescope, available at `https://github.com/pinno/pyoof-srt`.
- A WebGIS system for the download and visualization of meteorological data and forecasts (internally used at *Osservatorio Astronomico di Cagliari*).
- An automated pipeline for the simulation of full photogrammetry sessions: generation of synthetic image coordinates, reconstruction of 3D coordinates by executing bundle adjustment algorithms, evaluation of the accuracy of the measured coordinates (property of *Regione Autonoma della Sardegna*).
- Reverse-engineering algorithms for the inference of gene regulatory networks; available for download at `http://sysgensim.sourceforge.net`.
- SysGenSIM, a MATLAB simulation tool in a friendly graphical user interface for the simulation of systems genetics experiments and data; available for download at `http://sysgensim.sourceforge.net`.
- Orione, a Galaxy-based framework dedicated to microbiology and metagenomics analysis, freely available at `http://orione.crs4.it`.

Awards

- COST invitation to *StatSeq Gene Network Inference Meeting* (2013).
- FEBS *Youth Travel Funds* (YTFs) for Young Scientists (2011).
- Best performer (2nd place, in-vivo) in the *DREAM5 Network Inference Challenge* (2010).
- Best performer (1st place) in the *DREAM4 Prediction of In Silico Networks Challenge* (2009).

Languages

- Italian (mother tongue).
- English (proficient user).