Federico M. **Barabas**

Postdoctoral researcher

Stockholm, Sweden

(+46) 72 566 0896 | fede.barabas@gmail.com | fedebarabas.github.io | fedebarabas | federico | fbarabas

Profile

- Wrote a software that enabled large-scale image data analysis of biological structures. It allowed researchers to discover new mechanisms in the degeneration of neurons.
- Developed an original control and automation software for microscopy in Python currently in use at two research labs. Being open-source, it saves thousands of dollars in license fees and can be adapted to perform custom experiments.

Skills

Programming	Python for statistical data analysis (numpy, pandas, scikit-learn) and visualization (matplotlib, seaborn, PyQt), C++, SQL, Linux, Git, LaTeX.
Statistics	Correlation analysis, significance, parameter estimation, hypothesis testing, supervised and unsupervised learning.
Optics	Microscopy system design, construction and automation. Biological imaging at nanometric resolution.

Experience

Advanced Optical Bio-Imaging Lab, SciLifeLab *Stockholm, Sweden*
Postdoc researcher *2017 - PRESENT*
- Building a next-generation microscope capable of imaging biological structures with unprecedented detail.
  - Design of optical illumination and detection layout and concept.
  - Image and numerical data analysis and visualization
  - Programming of the device integration and automation.
  - Advising and teaching of Master students.

Applied NanoPhysics Group, Bionanosciences Research Center *Buenos Aires, Argentina*
PhD candidate *2012 - 2017*
- Designed and built a state-of-the-art microscope capable of acquiring images of biological samples with nanometric resolution.
  - Open-source modular integral control software description published in Review of Scientific Instruments (2016).
  - Code repository: github.com/fedebarabas/tormenta.
- Headed the development of an analysis tool to automatically quantify the presence of periodical structures in bioimaging.
  - The tool description was published in Scientific Reports (2017).
  - Code repository: github.com/fedebarabas/ringfinder.
  - It enabled the community to understand mechanisms of neuron degeneration, as published in Scientific Reports (2018).

Dept. of NanoBiophotonics, Max Planck Institute for Biophysical Chemistry *Göttingen, Germany*
PhD candidate internship *2013*
- Trained in optical microscopy at high resolutions at the laboratory of Nobel laureate Dr. Stefan Hell.

Detection Technologies and Astroparticles Institute *Buenos Aires, Argentina*
Licenciate thesis *2011 - 2012*
- Determined the statistical counting efficiency of particle detectors for the upgrading of the Pierre Auger Observatory.

Education

Buenos Aires University *Buenos Aires, Argentina*
PhD in Physical Sciences *2012 - 2017*
Buenos Aires University *Buenos Aires, Argentina*
Licenciate in Physical Sciences *2006 - 2012*

Courses

Stanford University   *www.coursera.org*
MACHINE LEARNING COURSE   *Nov 2017 - Jan 2018*

Teaching

Physics Dept., Faculty of Exact and Natural Sciences, Buenos Aires University   *Buenos Aires, Argentina*
GRADUATED ADVANCED LABORATORY TEACHING ASSISTANT   *2015 - 2017*

Science and Technology School, San Martín National University   *Buenos Aires, Argentina*
GRADUATED TEACHING ASSISTANT   *2012 - 2013*

Management

Optical Society of America Student Chapter   *Buenos Aires University*
PRESIDENT   *2015 - 2017*
- Doubled the number of active members through the organization of recruitment activities.
- Wrote winning grant applications that led to a 50% growth in the Chapter resources.
- Launched a new activity where young researchers presented their work to spark collaborations and inspire students into optics.

Additional information

Languages   Spanish (native), English (fluent), Swedish (basic), Italian (basic).

Tech interests   Machine learning, deep learning, artificial intelligence, open source projects, open data, open hardware, data visualization, data journalism.

Other interests   bike fixing and touring, space and astronomy, reddit, Seinfeld, Simcity.