

# 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 and unbiased image analysis of periodical 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 (numpy, matplotlib, pandas, device control, multiprocessing), Linux, Git, LaTeX.  
**Statistics** Probability distributions, significance, parameter estimation, hypothesis testing.  
**Optics** Microscopy system design and construction. Bioimaging 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.
  - Advising and teaching of Master students.
  - Programming of the device integration and automation.

### 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](https://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](https://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 INTERSHIP

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

LICENCIATURA IN PHYSICAL SCIENCES (EQUIVALENT TO BACHELOR + MASTER)

2006 - 2012

## Courses

### Stanford University

[www.coursera.org](https://www.coursera.org)

MACHINE LEARNING COURSE

Nov 2017 - Jan 2018

## Teaching

---

### **Physics Dept., Faculty of Exact and Natural Sciences, Buenos Aires University**

GRADUATED ADVANCED LABORATORY TEACHING ASSISTANT

*Buenos Aires, Argentina*

2015 - 2017

### **Science and Technology School, San Martín National University**

GRADUATED TEACHING ASSISTANT

*Buenos Aires, Argentina*

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.

## Languages and interests

---

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

**Interests** bike fixing and touring, guitar, space and astronomy, reddit, Seinfeld.