

# Sameh Othman

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## Education

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**Ph.D., Statistical Physics** *University of Cologne* **Cologne, Germany** 2021 - Jun 2025  
Thesis: *Active Brownian Particles in Alignment Fields*. Research hosted at IAS-2, Forschungszentrum Jülich.  
Course (grade 2.0): Advanced Statistical Physics.

**M.Sc., Physics** *Birzeit University* **Birzeit, Palestine** 2016 - 2020

**B.Sc., Physics (Minor in Computer Science)** *Birzeit University* **Birzeit, Palestine** 2010 - 2016

## Professional Experience

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**Doctoral Researcher** *Forschungszentrum Jülich (IAS-2)* **Jülich, Germany** 07/2021 - 06/2025

- Replicated established ABP models and added an **alignment field**, quantifying its impact on binodals ( $Pe-\phi$ ), critical-point location, and critical exponents.
- Designed, ran, and analyzed large-scale **Python**-driven simulations; built **data pipelines** to extract features, validate models, and visualize results (NumPy, pandas, Matplotlib, Jupyter).
- Applied **statistical inference** and **time-efficient** analysis to map phase behavior, critical points, and dynamics in complex data sets; documented methods for reproducibility.
- Used **HPC (SLURM)** to scale workloads; version-controlled workflows with **Git** on **Linux**.
- Mentored junior researchers; co-supervised **2 Bachelor** (3 months each) and **3 high-school** student projects; documented methods and emphasized reproducible research, data quality, code reviews, and clear reporting.

- Supported  $\sim 10$  colleagues in **diverse fields** (medical imaging, quantum physics, solar cells, engineering) with data exploration, analysis, and visualization; developed and debugged multi-language pipelines (Python, MATLAB, SQL) customized per field.

**Research Intern (Machine Learning)** *Max Planck Institute for Intelligent Systems Tübingen* 10/2020 - 05/2021

- Proposed an **exposure-aware** Bayesian community-detection model that distinguishes *non-exposure* from non-affinity; outputs calibrated pairwise **exposure probabilities**  $Q_{ij}$  and improves **link prediction**.
- Built an Expectation–Maximization (**EM**) inference pipeline with closed-form updates for  $u, w, \mu$ ; Python implementation designed for scalability and reproducibility.
- Created synthetic data from the generative model to validate the model performance on the ground truth values.
- Validated on synthetic graphs and the American College Football Network: higher hidden-link **AUC** and exposure AUC 0.65–0.75; outperformed the baseline in **142/150** trials (4 fold per 10 random seeds); **co-authored** the LNCS (2022) chapter.

**Voluntary Instructor** *The Carpentries* **Remote / Global** 2024 - Present

- Teach and co-teach **Python**, **Git**, and **Bash** to research audiences; emphasize **data analysis**, **version control**, and **reproducible** workflows; delivered **4+** classes ( $\sim 20$  participants each) to cohorts ranging from novices to senior researchers worldwide.

**Research Intern (Master's Thesis)** *Forschungszentrum Jülich* **Jülich, Germany** 2017 - 2018

- Modeled electrostatics-driven nanoparticle–membrane interactions; designed numerical experiments and produced publication-quality analyses and figures.
- Developed C/C++ solvers for coupled membrane-shape equations and the nonlinear Poisson–Boltzmann equation; validated results via parameter sweeps.
- Built a reproducible workflow (scripts for parameter scans, optimization, data cleaning, and plotting), version-controlled with **Git** and clearly documented.

## Observatory Manager *Birzeit University*

**Birzeit, Palestine** 2016 - 2020

- Directed operations of Palestine's largest academic observatory; managed facilities and cross-department coordination, led the astronomy club team, and organized outreach events for 20–1,500 attendees.
- Designed and delivered instruction on telescope theory and hands-on operation; trained learners from novices to amateur astronomers to set up, align, and operate telescopes and to acquire and process data/images of galaxies, nebulae, and planets.

## Skills

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- **Programming & Data:** Python (NumPy/pandas/Matplotlib/Jupyter), SQL; Bash; Git; Linux; C/C++; MATLAB.
- **ML & Statistics:** Probabilistic modeling; statistical inference; model evaluation & cross-validation; data visualization.
- **Platforms:** High-Performance Computing (SLURM clusters); Google Cloud; parallel programming.
- **Tools:** LAMMPS (simulation),  $\text{\LaTeX}$ , WordPress.
- **Working Knowledge:** Docker, PyTorch, TensorFlow.

## Leadership & Activities

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### Member / Organizer *Scientists For Palestine*

**Remote / Global** 2016 - Present

- Co-led subcommittee strategy and operations; set goals, ran regular check-ins, tracked action items, and implemented process improvements across teams.
- Organized 6 **Palestinian Advanced Physics Schools (PAPS)** with  $\sim 5$  international speakers and  $\sim 50$  students per school; managed the scientific program, speaker coordination, visas/travel, and local on-site logistics.

### Cofounder / Member *NOVA for Astronomy and Space Science*

**Palestine** 2017 - Present

- Co-founded and grew an amateur-astronomy group into a professional team delivering private and public educational events to audiences of  $\sim 500$ .
- Authored, designed, and delivered educational materials (workshop guides, curricula, observing handouts) for a  $\sim 50$ -member community.

## Teaching & Community

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### Teaching Assistants *Code/Astro*

**In person / Remote** 2021 - Present

- TA/Mentor for week-long Code/Astro workshops; guided small teams to plan and ship maintainable open-source astronomy tools; emphasizing problem scoping, modular Python design, testing, and clear documentation.
- Supported hands-on sessions on Git/GitHub workflows (branching, pull requests, code review), collaborative Jupyter practices, and reproducible research; provided debugging support to keep teams unblocked.

### Teaching Assistants *Birzeit University*

**Birzeit, Palestine** 2016 - 2020

- Delivered and supported undergraduate physics labs and tutorials; prepared experiments, guided students during sessions, and assessed lab reports; assisted course instruction and supervised/graded exams for  $\sim 1,000$  students.

## Talks & Posters Presentations

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- Annual Meeting SoftComp, Ancona, Italy (Talk, May 2023); Invited talk, University of Burgundy, Dijon, France (May 2023); SoftComp, Lyon, France (Poster, May 2024); NIC Symposium, FZJ, Jülich (Poster, Sep 2022).

## Awards & Honors

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**Best Master's Thesis in Science (Palestine)** *Seventh Palestinian Conference on Modern Trends in Mathematics and Physics*

Aug 2022

**Palestinian-German Science Bridge (PGSB) Fellowship** *Forschungszentrum Jülich (IAS-2)* Jul 2021 – Dec 2021

**PGSB Funded Master Thesis Research Visit** *Forschungszentrum Jülich* Oct 2017 – Sep 2018

- Selected through a competitive process from a pool of  $\sim 50$  applicants for the fellowship.

## Interests

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Chess (daily); Photography & Astrophotography; Reading (science & non-fiction); Meditation & mindfulness.