Sameh Othman

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Education

Ph.D., Statistical Physics *University of Cologne* **Cologne, Germany** *2021 - 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

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

- Replicated established ABP models and added an **alignment field**, quantifying its impact on binodals (Pe–ϕ), 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 ∼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, Germany** *2020 - 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, μ; 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.

Voluntery 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 (∼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

- **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), LaTeX, WordPress.
- **Working Knowledge**: Docker, PyTorch, TensorFlow.

Leadership & Activities

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 ∼5 international speakers and ∼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 ∼500.
- Authored, designed, and delivered educational materials (workshop guides, curricula, observing handouts) for a ∼50-member community.

Teaching & Community

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 ∼1,000 students.

Talks & Posters Presentations

- 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

Best Master's Thesis in Science (Palestine) *Seventh Palestinian Conference on Modern Trends in Mathematics and Physics* *2022*

Palestinian-German Science Bridge (PGSB) Fellowship *FZJ (IAS-2)* *2021 – 2024*

PGSB Funded Master Thesis Research Visit *FZJ (IAS-2)* *2017 – 2018*

- Selected through a competitive process from a pool of ∼50 applicants for the fellowship.

Interests

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