MayaSegal, Ph.D. Candidate

Biophysicist | Data Scientist

Contact

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Profiles

LinkedIn
GitHub
ResearchGate

Programming

Python, Unix, SQL, git, LaTeX

Skill Highlights

Molecular biology
Biochemistry
Spectroscopy
Microscopy
Assay Development
Workflow Optimization
Data Wrangling
Data Visualization
Statistical Analysis
Documentation
Version Control

Profile

Biophysics Ph.D. Candidate at the University of California, Los Angeles, specializing in single-molecule spectroscopy. Experienced in conducting high-impact research with a strong analytical background. Seeking to transition to industry roles in computational chemistry/biology, data science, and bioinformatics. Proficient in Python programming and passionate about data analysis. Graduating in October 2023.

Experience

2023 **Biologics Analytical Operations, Gilead Sciences** Oceanside, CA
Summer Intern
Utilized data science to streamline workflows and enhance productivity for end users.

- Conducted data wrangling and visualization, facilitating insights from high-dimensional data.
- Engineered a real-time monitoring Plotly Dashboard for mass spectrometer instrument status.
- Automated peptide mapping lab notebook submissions, streamlining workflow efficiency.
- Enhanced Quality by Design Database (QbD-DB) workflow, optimizing user experience.

2022 **Biologics Analytical Operations, Gilead Sciences** Oceanside, CA
Summer Intern
Pioneered the establishment of a Quality by Design Database (QbD-DB) within the Benching lab notebook ecosystem, orchestrating data design, curation, and relational connectivity for streamlined workflows.

- Optimized data retrieval, implemented efficient data upload processes, and facilitated data analysis workflows.
- Leveraged SQL for data aggregation within the warehouse, improving data accessibility.
- Successfully launched QbD-DB and provided comprehensive end-user training.
- Conducted data wrangling and visualization for complex high-dimensional data sets.

2016–2023 **Shimon Weiss Lab, UCLA** Los Angeles, CA

Graduate Student Researcher

Conducted pioneering research in biophysics, specializing in the development of high-throughput single-molecule Fluorescence Resonance Energy Transfer (smFRET) spectroscopy techniques to investigate transcription initiation by RNA Polymerase.

- Designed and executed smFRET assays using a cutting-edge high-throughput confocal microscope, unveiling structural dynamics and kinetics of transcription by bacterial RNA polymerase.
- Spearheaded the development of smFRET assays to probe structural and mechanistic aspects of bacterial transcription by RNA polymerase and viral transcription/replication by RNA-dependent RNA polymerase.
- Orchestrated sample preparation, including the design and construction of a plasmid library for protein labeling, conducted protein and oligonucleotide purification via gel electrophoresis, and conducted cell and protein preparations.
- Innovatively designed smFRET assays, encompassing oligonucleotide construct design, FRET pair design, labeling strategies, and predicted FRET efficiencies using cutting-edge software.
- Performed advanced data analysis, including statistical analysis of large single-photon datasets, utilizing Python to extract meaningful insights.

2016 **Gelbart & Knobler Lab, UCLA** Los Angeles, CA

Graduate Student Researcher

Conducted a focused summer rotation with a research emphasis on the physical chemistry of RNA virus self-assembly.

- Employed a theory-driven approach to investigate the physical properties of RNA viruses and virus-like proteins (VLPs), advancing the understanding of their fundamental characteristics.
- Characterized VLP-enveloped viral RNA through tunneling electron microscopy.

2015-2016 **Yildiz Lab, UC Berkeley** Berkeley, CA

Undergraduate Student Researcher

Engaged in groundbreaking research utilizing Total Internal Reflection Fluorescence (TIRF) microscopy to investigate the behavior of kinesin motor proteins at the super-resolution level.

- Employed TIRF microscopy techniques to elucidate the influence of intramolecular strain on the coordination of kinesin motor domain stepping patterns, advancing the understanding of motor protein mechanics.
- Spearheaded the optimization of small custom quantum dots for high-resolution single-molecule imaging, enabling precise tracking of motor proteins.
- Conducted dual-color quantum dot surface immobilized motility assays, facilitating single-molecule tracking and colocalization studies of kinesin motor domains using TIRF microscopy.
- Optimized and characterized bioconjugation techniques for labeling kinesin with fluorescent probes.

2015 **Molecular Foundry, Lawrence Berkeley National Lab** Berkeley, CA
Undergraduate Student Researcher
Contributed to a dynamic summer internship focused on the passivation and conjugation of upconverting nanocrystals and quantum dots.

- Passivated the surfaces of upconverting nanocrystals and quantum dots using a novel amphiphilic peptoid wrapping, enhancing their stability and functionality for subsequent applications.
- Pioneered a method for precise and controlled modification of peptoid-conjugated upconverting nanoparticle surfaces, enabling targeted bioconjugation and expanded versatility.
- Proficiently employed a range of characterization techniques, including UV-Vis spectroscopy, MALDI mass spectrometry, dynamic light scattering (DLS), fast protein liquid chromatography (FPLC), and fluorimetry, to comprehensively analyze and validate experimental outcomes.

Education

2016–2023 **PhD** Biophysics University of California, Los Angeles
Department of Chemistry & Biochemistry

Thesis Methods development toward non-equilibrium studies of transcription initiation by *E. coli* RNA Polymerase

Coursework Basic science of transcription initiation by RNA Polymerase, single-molecule spectroscopy, optics, data analysis and visualisation, modeling, assay development, PCR, cloning, gel separations, cell prep.

2016–2018 **M.S.** Biophysics University of California, Los Angeles
Department of Chemistry & Biochemistry

Coursework bio bootcamp, structural biology, crystallization lab, analytical methods lab, statistical mechanics, quantum mechanics, mathematics for scientists and engineers.

2014–2016 **B.S.** Chemical Biology University of California, Berkeley
College of Chemistry

Coursework chemical biology, biochemistry, bioinorganic chemistry, molecular biology, statistical mechanics, quantum mechanics, inorganic chemistry, analytical techniques lab, advanced organic chemistry

Software Skills

Microsoft 365
Adobe Suite
Python
Anaconda
Jupyter Notebooks
VS Code
FIJI (Image-J)
PyMol

Interpersonal Skills

Reliable
Resourceful
Adaptable
Punctual
Team player
Detail oriented
Thoughtful
Inclusive
Organized

Languages

Hebrew ●●●○○
Spanish ●○○○○

Leadership

Joint Research Safety Initiative
Co-Founder,
ex-President

Publications

Journal Articles

High-Throughput smFRET Analysis of Freely Diffusing Nucleic Acid Molecules and Associated Proteins
Maya Segal, Antonino Ingargiola, Eitan Lerner, SangYoon Chung, Jonathan A. White, Aaron Streets, S. Weiss, and X. Michalet
Methods *169 (Oct. 2019) pp. 21–45. 2019,* DOI: 10.1016/j.ymeth.2019.07.021

Optical Crosstalk in SPAD Arrays for High-Throughput Single-Molecule Fluorescence Spectroscopy
Antonino Ingargiola, Maya Segal, Angelo Gulinatti, Ivan Rech, Ivan Labanca, Piera Maccagnani, Massimo Ghioni, Shimon Weiss, and Xavier Michalet
Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment. *New Developments In Photodetection 2017 912 (Dec. 2018) pp. 255–258. 2018,* DOI: 10.1016/j.nima.2017.11.070

48-Spot Single-Molecule FRET Setup with Periodic Acceptor Excitation
Antonino Ingargiola, Maya Segal, Angelo Gulinatti, Ivan Rech, Ivan Labanca, Piera Maccagnani, Massimo Ghioni, Shimon Weiss, and Xavier Michalet
The Journal of Chemical Physics *148.12 (Mar. 2018) p. 123304. 2018,* DOI: 10.1063/1.5000742

Covalent Protein Labeling and Improved Single-Molecule Optical Properties of Aqueous CdSe/CdS Quantum Dots
Sara M. Wichner, Victor R. Mann, Alexander S. Powers, Maya A. Segal, Mustafa Mir, Jigar N. Bandaria, Mark A. DeWitt, Xavier Darzacq, Ahmet Yildiz, and Bruce E. Cohen
ACS Nano *11.7 (July 2017) pp. 6773–6781. 2017,* DOI: 10.1021/acsnano.7b01470

Awards

2022 **Michael E. Jung Excellence in Teaching Award - Recipient** Department of Chemistry, UCLA
Awarded to the top teaching assistants.

2021 **Summer Mentored Research Fellowship - Recipient** Department of Chemistry, UCLA
Awarded to outstanding doctoral students during their summer quarter.

2020 **EH&S Initiative Nominee (I.N.) for Safety award - Recipient** Environmental Health & Safety, Department of Chemistry, UCLA
Awarded graduate students committed to improving safety and safety culture.

2019 **George Gregory Fellowship - Recipient** Department of Chemistry, UCLA
Awarded to outstanding graduate students upon completion of their doctoral qualifying examination.

2018 **Audree Fowler Fellows in Protein Science - Nominee** Department of Biochemistry, UCLA
Awarded to promising Ph. D. candidates working in protein science.

2016 **Dean's Scholar Award - Recipient** Department of Chemistry, UCLA
Prestigious fellowship awarded to top graduate student applicants.

Volunteering

2021 **Graduate Student Volunteer** California NanoSystems Institute (CNSI) Nanoscience Outreach Program volunteer
Bringing nancoscience to elementary, middle, and high school students in greater LA area.

2019 **Founder and president of UCLA Chemistry and Biochemistry Joint Safety Initiative** EH & S, Dept. Chemistry & Biochemistry
Establishing ownership of research safety within labs — led by researchers, for researchers.

2018 **Graduate Student Volunteer** CNSI Nanoscience Outreach Program volunteer
Development of hands-on liquid crystal laboratory for middle and high school students.

2017 **Graduate Student Volunteer** CNSI Nanoscience Outreach Program volunteer
Advisor and mentor of high school team in Nannovation competition.

2016 **Graduate Student Volunteer** Department of Chemistry & Biochemistry, UCLA
Bringing science to the public through the Explore Your Universe science festival.

Interests

Professional: biophysics, data analysis and visualization, computational biology, bioinformatics, machine learning, software engineering, all things Python. **Personal:** learning, reading, cooking, baking, gardening, yoga

References

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