

# Anwar Khaddaj

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## EDUCATION

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- Rice University** - Houston, Texas Aug 2022 - May 2025  
MA, Computational and Applied Mathematics, GPA: 3.91/4.0  
Fully Funded Fellowship and Research Assistantship
- Lebanese American University** - Beirut, Lebanon Aug 2019 - May 2022  
BS, Mathematics with High Distinction, Minor in Computer Science, GPA: 3.97/4.0  
Full Merit Scholarship

## RESEARCH EXPERIENCE

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- Rice University**, Dept. of Computational Applied Mathematics and Operations Research  
Graduate Research Assistant, Advisor: Dr. Matthias Heinkenschloss May 2023 - Present
- Analyzed non-linear parameter estimation problems and collocation methods for differential equations with applications in biophysical neuron models in collaboration with Baylor College of Medicine.
  - Developed a Python software to solve parameter estimation problems incorporating post-optimality analysis and automatic differentiation techniques.
  - Trained a postdoctoral researcher at Baylor College of Medicine on the use of developed software and mentored three undergraduates by developing a series of presentations on collocation methods.
  - Won Outstanding Poster Award out of around 65 posters at SIAM TX-LA conference at Baylor University.
- Lebanese American University**, Dept. of Computer Science and Mathematics  
Undergraduate Research Assistant, Advisor: Dr. Rony Touma Jan 2021 - August 2021
- Studied numerical methods for differential equations with applications in modeling of Covid-19.
  - Participated in the summer undergraduate research and discovery program and completed over 10 research workshops and a five hour Python programming workshop.

## TALKS AND PRESENTATIONS

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1. *Parameter estimation of neuron models using subset selection and dynamic optimization*, Invited Talk at online graduate research seminar at Lebanese American University, Feb 18, 2025.
2. *Confidence and Degeneracy in Sequential Parameter Estimation of Biophysical Neuron Models*, Poster Presentation at SIAM TX-LA 2024 Conference, Outstanding Poster Award, Oct 11 - 13, 2024.
3. *Confidence and Degeneracy in Sequential Parameter Estimation of Biophysical Neuron Models*, Poster Presentation at Research Training Group in Numerical Mathematics & Scientific Computing (NASC RTG) Annual Workshop, Oct 4, 2024.
4. *Collocation and Galerkin Time Stepping Methods*, Contributed Talk at NASC RTG Ranch Retreat, Apr 19 - 20, 2024.
5. *An All-At-Once Approach to Parameter Estimation in Neuron Models*, Poster Presentation at SIAM TX-LA 2023 Conference, Nov 3 - 5, 2023.
6. *An All-At-Once Approach to Parameter Estimation in Neuron Models*, Poster Presentation at NASC RTG Annual Workshop, Oct 13, 2023.

## RELEVANT PROJECTS AND THESES

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1. *Parameter Estimation of Neuron Models using Subset Selection and Dynamic Optimization*, Master's thesis at Rice University, defended on Nov 5, 2024.
2. *Reduced Order Modeling of the Heat Equation with Diffusion and Advection*, Data Science and Dynamical Systems final course project with Dr. Athanasios C. Antoulas at Rice University, Spring 2024.
3. *Lorenz Equations: Mechanical Analog, Application, and Numerical Experiments*, Senior project with Dr. Leila Issa at Lebanese American University, Spring 2022.

## HONORS AND AWARDS

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<b>Outstanding Poster Award (65 posters)</b> , SIAM TX-LA conference	Oct 2024
<b>\$100K Global Student Prize Top 50 Finalist (11000 applications, 176 countries)</b> , Chegg	July 2024
<b>Recognition Award</b> , School of Arts and Sciences, Lebanese American University	May 2022
<b>Hackathon Winner</b> , Fouad Makhzoumi Innovation Center, Lebanese American University	Feb 2022
<b>Jury's Choice Award</b> , TAQA Youth Well-being Championship, Injaz and UNICEF Lebanon	Nov 2022
<b>Hero Mathematics Tutor</b> , MMKN Organization	May 2021
<b>Full Merit Scholarship</b> , Lebanese American University	Aug 2019
<b>Top 16 National Exams</b> , Lebanese Baccalaureate General Sciences	July 2019

## TEACHING

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<b>Grader</b> , Rice University	Aug 2022 - Present
<ul style="list-style-type: none"><li>• CMOR 520, Computational Science, Fall 2024</li><li>• CMOR 530, Iterative Methods and Unconstrained Optimization (Qualifying Exam Course), Spring 2024</li><li>• CMOR 524, Advanced Numerical Analysis (Qualifying Exam Course), Fall 2023</li><li>• CAAM 336, Differential Equations in Science and Engineering, Spring 2023</li><li>• CAAM 335, Matrix Analysis, Fall 2022</li></ul>	
<b>Teaching Assistant</b> , Lebanese American University	Jan 2022 - May 2022
<ul style="list-style-type: none"><li>• MTH 102, Calculus II, Spring 2022</li></ul>	
<b>Trainer</b> , Geek Express	Sep 2019 - July 2022
<ul style="list-style-type: none"><li>• AI4Climate Hackathon in collaboration with UAE ministry of climate change and environment, July 2022</li><li>• MIT App Inventor, Sep 2019 - June 2022</li></ul>	
<b>Tutor &amp; Coordinator</b> , MMKN Organization	Sep 2019 - June 2021
<ul style="list-style-type: none"><li>• High School Mathematics for students at two public schools</li></ul>	

## WORK EXPERIENCE

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<b>Engineering Coach</b> , Activate Engineering Communication Program, Rice University	Aug 2024 - Present
<ul style="list-style-type: none"><li>• Coached over 20 Rice undergraduate and graduate engineering students on crafting their design projects, research abstracts, and presentations.</li><li>• Reviewed and provided feedback for students on their posters, documentation, and communication skills.</li></ul>	
<b>Mentor</b> , Company Program, Injaz Lebanon	Jun 2024 - Sep 2024
<i>The Company Program offers an intensive course for high school and university students helping them learn entrepreneurial skills and start their own venture.</i>	
<ul style="list-style-type: none"><li>• Supported high school students in refining their innovative STEM-based ideas into viable business ventures.</li><li>• Guided a startup through 12 sessions focusing on developing business plans, financial projections, project management and helped them win “Best Social Impact Award” at the national competition hosted by Injaz.</li></ul>	

- Coached high school students on public speaking skills preparing them for competitions and public exhibitions.

**Outreach Director**, Graduate Student Association, Rice University

May 2023 - Aug 2024

- Collaborated with the Office of International Students and Scholars (OISS) to address graduate student issues through two campus-wide programs and coffee chats.
- Directed the International Buddy Program (IBP), leading a team of over 50 volunteers to provide essential support and resources to 350 incoming international graduate students prior graduate orientation.

**Co-Founder and CTO**, Stoodie

Feb 2022 - Aug 2024

*A job shadowing platform helping high school students find their suitable career path by connecting them with professionals.*

- Collaborated with a web developer to design job shadowing processes and a front-end tailored to 100+ surveyed students.
- Matched a cohort of eight students with different professionals at an AI education company.
- Received \$2K in seed-funding from UNICEF Lebanon and Kingdom of Netherlands, and won Jury's choice award by Injaz Lebanon and LAU hackathon for excellence in business pitch and entrepreneurial strategy.

## SERVICE

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**Treasurer**, Rice SIAM Chapter

Sep 2023 - Aug 2024

**Graduate Panelist**, Rice University Gulf Coast Undergraduate Research Symposium

Nov 2023

**International Buddy Program Leader**, Rice Office of International Students

May 2023 - Aug 2023

**Speaking Coach**, TEDxRice

Sep 2022 - Dec 2022

**Diversity Lunch Organizer**, Rice CMOR Grad Seminar

Nov 2022

**President**, Mathematics Club at Lebanese American University

Sep 2021 - May 2022

## SKILLS AND LANGUAGES

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**Programming Languages:** Python, Java, MATLAB, C++ (OpenMP, MPI, CUDA), Julia.

**Python Libraries:** NumPy, SciPy, Matplotlib, Pandas, JAX, Scikit-Learn, TensorFlow, Keras.

**Software:** Git, IPOPT, Pyomo, Bash,  $\LaTeX$ .

**Languages:** Bilingual - Fluent in English and Arabic; Basic in German and French.