

Ralph Razzouk

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RESEARCH INTERESTS

Mathematical physics, high energy theory, quantum gravity, quantum field theories, string theory, topological quantum field theories, quantum computing, quantum information theory, quantum algorithms and complexity, computational physics, machine and deep learning, cosmology, black holes, pulsars, quasars, dark matter, dark energy, quantum biology, artificial intelligence, big data.

EDUCATION

Purdue University Ph.D. in Theoretical High-Energy Physics	West Lafayette, IN 2023 – Present
Notre Dame University - Louaize B.Sc. in Mathematics, <i>Summa Cum Laude</i> , Advisor: Dr. Roger Nakad, Dean's Honor List	Zouk Mosbeh, Lebanon 2020 – 2023
Notre Dame College of Louaize Lebanese Baccalaureate in General Sciences	Zouk Mosbeh, Lebanon 2017 – 2020

EXPERIENCE

Razz Mathematics, Physics, and Computer Science Videos – Making videos and playlists about topics I find interesting	Remote, YouTube 2019 – Present
Purdue University Physics Teaching Assistant	West Lafayette, IN August 2023 – Present
SiiRA Intern in AI Prompting, Front-end, and Back-end Development – Enhancing SiiRA's JobGPT – Aggregating all AI tools under one database	Remote, Beirut June 2023 – August 2023
Notre Dame College of Louaize Middle School and High School Physics Teacher – Taught mechanics, thermodynamics, electricity, gravitation, optics, etc. – Taught students in both Lebanese Baccalaureate and American programs	Zouk Mosbeh, Lebanon 2021 – 2022
Freelance Physics and Mathematics Tutor – Worked as a physics and mathematics tutor for high school students	Remote 2018 – 2022

RESEARCH EXPERIENCE

- [1] A. Jung, A. Wildridge, and **R. Razzouk**, “Reconstructing Proton-Proton Collision Positions at the Large Hadron Collider with a D-Wave Quantum Computer”, (4 months), Aug. 2024.
- [2] M. Kruczenski and **R. Razzouk**, “The S-matrix Gauge Theory Bootstrap (4D) Pion-Pion Scattering”, (7 months), May 2024.
- [3] P. Eid, C. El Helou, P. Mouaikel, and **R. Razzouk**, “AI Prompting”, (2 months), Jun. 2023.
- [4] P. Eid, C. El Helou, P. Mouaikel, and **R. Razzouk**, “Seismic Activity on the Moon”, (1 month), Oct. 2023.
- [5] C. Dawra, C. El Helou, P. Mouaikel, and **R. Razzouk**, “Studying Chaotic 3-Body Systems to Propel Spacecraft on Interstellar Trajectories”, (2 months), Dec. 2022.
- [6] R. Nakad and **R. Razzouk**, “Hybrid Functions and Approaches to Solve Some Fredholm and Volterra Integro-Differential Equations”, (1 month), Nov. 2022.

PROJECTS

For a comprehensive list of projects, see ralphrazzouk.com/works

- **NASA Space Apps Challenge** (2022 & 2023)
Modeling Seismic Activity on the Moon Using Three.js
[Link to Project](#)
- **Black Hole Simulator** (2023) (In Progress)
Interactive 3D Black Hole Simulator Using Three.js
- **Theorym** (2023) (Under Development)
Open-Science Platform
- **Quantum Gate Visualizer** (2024)
Visualization Tool for Single Qubit Rotations
[Link to Project](#)

TALKS

InSide NDU Podcast S1E9 – Gravitating towards a Lebanese Space Sector	Notre Dame University September 20, 2023
Honoring Ceremony Talk Presented to Showcase NASA Space Apps Success	Notre Dame University December 1, 2022

WORKSHOPS & SCHOOLS ATTENDED

Algebraic Topology in Physics Lectures by Pavel Putrov	Physics Latam May 29, 2024 – June 7, 2024
4th Annual Quantum Summer School Quantum Science Center – Hosted by Purdue Quantum Science and Engineering Institute (PQSEI)	Purdue University April 30, 2024 – May 4, 2024

SKILLS

- **Programming:** Python, \LaTeX , C++, JavaScript, HTML, CSS, MATLAB, Mathematica, PHP, Laravel, MySQL, ReactJS, ThreeJS, NextJS
- **Software:** Adobe Photoshop, Adobe Illustrator, Adobe After Effects, Adobe Audition, Adobe Premiere, DaVinci Resolve, Blender, Sony Vegas 19.0
- **Familiar OS:** Windows and Linux
- **Soft Skills:** Innovation, detail oriented, problem solving, decision-making, critical thinking, public speaking

LANGUAGES

- **English:** Proficient User
 - **Duolingo English Test:** 150/160
 - **TOEFL iBT:** 111/120
- **Arabic:** Proficient User
- **French:** Basic User

SCHOLARSHIPS AND AWARDS

- NASA Space Apps Challenge Global Finalists Honorable Mentions (Team Leader) 2023
- Exceptional Volunteering Certification by Caritas Lebanon 2023
- Notre Dame University - Louaize Honoring Ceremony for success in NASA Space Apps Challenge 2022
- NASA Space Apps Challenge Global Finalists Honorable Mentions (Team Leader) 2022
- Academic Scholarship at Notre Dame University - Louaize 2020 – 2023
- First place in Astronomy Competition at Notre Dame University - Louaize 2019
- Second place in Robotics Competition at Lebanese German University 2019
- First place in Young Entrepreneur Showdown at Notre Dame University - Louaize 2018

EXTRACURRICULAR ACTIVITIES

- Webmaster at Physics Graduate Student Association (PGSA) at Purdue University 2024 – Present
Maintain and update the PGSA website, act as the graduate student representative on the Physics Computer Committee, act as a liaison for PGSA members regarding any issues relating to physics
- Student Member at American Physical Society (APS) 2023 – Present
- Student Member at American Mathematical Society (AMS) 2023 – Present
- Student Member at American Society of Mechanical Engineers (ASME) 2022 – Present
Participated in events and competitions, attended seminars/webinars, and helped the executive committee at NDU
- President of Astronomy Club at Notre Dame University - Louaize 2021 – 2023
Organized and carried out astronomy activities such as stargazing, movie and quiz nights, observatory visits, and enriched the community with scientific astronomy knowledge