

# Giavanna Jadick

✉ [giavanna@uchicago.edu](mailto:giavanna@uchicago.edu)  [github.com/gjadick](https://github.com/gjadick)

## EDUCATION

<b>Ph.D. Medical Physics, University of Chicago</b>   <i>Chicago, IL</i>	2021 – present
<ul style="list-style-type: none"><li>• Thesis: “Spectral x-ray imaging and quantitative phase retrieval”</li><li>• Advisor: Patrick La Rivière, Ph.D.</li><li>• Expected graduation: June 2026</li></ul>	
<b>B.S. Physics &amp; B.A. Political Science, Duke University</b>   <i>Durham, NC</i>	2016 – 2020
<ul style="list-style-type: none"><li>• Honors: Angier B. Duke Memorial Scholar, Cum Laude</li></ul>	
<b>Hillsborough High School</b>   <i>Tampa, FL</i>	2012 – 2016
<ul style="list-style-type: none"><li>• International Baccalaureate Program, top exam score in graduating class</li></ul>	

## AWARDS & HONORS

<b>AAPM/RSNA Graduate Fellowship</b>   <i>American Assoc. of Physicists in Medicine</i>	2025 – 2026
<b>Graduate Research Fellowship</b>   <i>National Science Foundation</i>	2023 – 2026
<b>Blue Ribbon Poster</b>   <i>American Assoc. of Physicists in Medicine, Annual Meeting</i>	2025
<b>Travel Award</b>   <i>Fully 3D Image Reconstruction Meeting</i>	2025
<b>2<sup>nd</sup> place, Young Investigator Symposium</b>   <i>American Assoc. of Physicists in Medicine, Midwest Chapter</i>	2025
<b>Poster Award, Top 3</b>   <i>Trainee Associate Member Symposium, Comprehensive Cancer Center, University of Chicago</i>	2025
<b>Lawrence H. Lanzl Medical Physics Graduate Fellowship</b>   <i>University of Chicago</i>	2024
<b>Dean’s Council Travel Award</b>   <i>Biological Sciences Division, University of Chicago</i>	2024
<b>Professional Development Grant</b>   <i>Comprehensive Cancer Center, University of Chicago</i>	2024
<b>Students &amp; Trainees Partial Scholarship</b>   <i>Virtual Imaging Trials in Medicine Conference</i>	2024
<b>Student Travel Award</b>   <i>SPIE Medical Imaging Conference</i>	2024
<b>Carl J. Vyborny Award (best journal club talk)</b>   <i>Grad. Program in Medical Physics, University of Chicago</i>	2024
<b>2<sup>nd</sup> place, Young Investigator Symposium</b>   <i>American Assoc. of Physicists in Medicine, Midwest Chapter</i>	2023
<b>\$2,000 Small Grant</b>   <i>Office of Diversity &amp; Inclusion, Biological Sciences Division, University of Chicago</i>	2023
<b>Truth-Based CT Reconstruction Challenge, Top 5</b>   <i>American Assoc. of Physicists in Medicine</i>	2022
<b>Summer Research Fellowship</b>   <i>Physics Department, Duke University</i>	2020
<b>Runner-Up Poster, Bass Connections Showcase</b>   <i>Interdisciplinary Studies, Duke University</i>	2020
<b>Angier B. Duke Memorial Scholarship</b>   <i>Duke University</i>	2016 – 2020
<b>Lord Rothermere Fellowship</b>   <i>Oxford University</i>	2017

## RESEARCH EXPERIENCE

<b>Ph.D. Candidate</b>   <i>Graduate Program in Medical Physics, University of Chicago</i>	2021 – present
<ul style="list-style-type: none"><li>• Advised by: Patrick La Rivière, Ph.D.</li><li>• Modeling spectral or multi-energy propagation-based <a href="#">phase-contrast</a> x-ray imaging techniques to develop a quantitative solution to the phase retrieval problem.</li><li>• Quantified achievable image quality with “MV-kV” dual-energy CT using <a href="#">estimation theory</a> in the context of basis material decomposition and <a href="#">simulation</a> techniques.</li><li>• Implemented <a href="#">multi-material decomposition</a> for dual-energy CT with cardiac imaging applications.</li><li>• Simulated <a href="#">CT</a> acquisitions with energy-integrating and photon-counting detectors for comparison.</li><li>• Mentored three students: (1) a summer student on dual-energy CT detectors for radiotherapy, (2) a graduate rotation student on multi-distance phase retrieval, and (3) an undergraduate on accurate phase-contrast imaging forward modeling.</li></ul>	

- Advised by: Ehsan Samei, Ph.D. & Ehsan Abadi, Ph.D.
- Helped develop realistic CT simulator (DukeSim), implementing features including beam hardening correction, tube current modulation, spherical detector geometry, photon counting noise model.
- Created DukeSim Python wrapper for rapid simulation studies.
- Developed and taught DukeSim trainings for other lab members.

**“Saxophone Mouthpiece Design” Research Team** | *Interdisciplinary Studies, Duke University*

2019 – 2020

- Advised by: Joshua Socolar, Ph.D. & Matthew Busch
- Created 3D archive of vintage sax mouthpieces using micro-CT scans.
- Extracted audio metrics from Fourier spectra of recordings with original vintage mouthpieces and 3D-printed copies.
- Analyzed micro-CT measurements in relation to extracted audio metrics in Python.

**Undergraduate Research Assistant** | *Physics Department, Duke University*

2019 – 2020

- Advised by: Christoph Schmidt, Ph.D.
- Assessed membrane response of *E. coli* under different osmotic conditions.
- Quantified elastic bending energy of bacterial membranes by writing image analysis scripts and running *Surface Evolver* simulations.

**Clinical Research Intern** | *Digestive Health Institute, Florida Hospital Tampa*

2015 – 2016

- Advised by: Alexander Rosemurgy, M.D. & Sharona Ross, M.D.
- Shadowed physicians in the clinic, on rounds, and in the operating room.
- Conducted rigorous statistical analysis and chart review of patients with esophageal disorders.
- Assessed post-op. satisfaction of achalasia patients with respect to age and other comorbidities.

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**PUBLICATIONS**
**Peer-reviewed articles**

1. E. Abadi, W. P. Segars, N. Felice, S. Sotoudeh-Paima, E. A. Hoffman, X. Wang, W. Wang, D. Clark, S. Ye, **G. Jadick**, M. Fryling, D. P. Frush, and E. Samei. AAPM Truth-based CT (TrueCT) reconstruction grand challenge. *Medical Physics*, pages 1–13, 2025. [doi:10.1002/mp.17619](https://doi.org/10.1002/mp.17619)
2. **G. Jadick**, M. Ventura, and P. J. La Rivière. Utility of photon-counting detectors for MV-kV dual-energy computed tomography imaging. *Journal of Medical Imaging*, 11(S1):S12811–S12811, 2024. [doi:10.1117/1.JMI.11.S1.S12811](https://doi.org/10.1117/1.JMI.11.S1.S12811)
3. H. DeBrosse, **G. Jadick**, L. J. Meng, and P. La Rivière. Contrast-to-noise ratio comparison between x-ray fluorescence emission tomography and computed tomography. *Journal of Medical Imaging*, 11(S1):S12808–S12808, 2024. [doi:10.1117/1.JMI.11.S1.S12808](https://doi.org/10.1117/1.JMI.11.S1.S12808)
4. **G. Jadick**, G. Schlafly, and P. J. La Rivière. Dual-energy computed tomography imaging with megavoltage and kilovoltage x-ray spectra. *Journal of Medical Imaging*, 11(2):023501–023501, 2024. **\*Featured on journal cover.** [doi:10.1117/1.JMI.11.2.023501](https://doi.org/10.1117/1.JMI.11.2.023501)
5. E. Abadi, **G. Jadick**, D. A. Lynch, W. P. Segars, and E. Samei. Emphysema quantifications with CT scan: Assessing the effects of acquisition protocols and imaging parameters using virtual imaging trials. *Chest*, 163(5):1084–1100, 2023. [doi:10.1016/j.chest.2022.11.033](https://doi.org/10.1016/j.chest.2022.11.033)
6. **G. Jadick**, E. Abadi, B. Harrawood, S. Sharma, W. P. Segars, and E. Samei. A scanner-specific framework for simulating CT images with tube current modulation. *Physics in Medicine & Biology*, 66(18):185010, 2021. [doi:10.1088/1361-6560/ac2269](https://doi.org/10.1088/1361-6560/ac2269)
7. D. J. Downs, **G. Jadick**, F. Swaid, S. B. Ross, and A. S. Rosemurgy. Age and achalasia: how does age affect patient presentation, hospital course, and surgical outcomes? *The American Surgeon*, 83(9):952–961, 2017. [doi:10.1177/000313481708300931](https://doi.org/10.1177/000313481708300931)
8. A. Rosemurgy, D. Downs, **G. Jadick**, F. Swaid, K. Luberic, C. Ryan, and S. Ross. Dissatisfaction after laparoscopic Heller myotomy: The truth is easy to swallow. *The American Journal of Surgery*, 2017. [doi:10.1016/j.amjsurg.2017.03.043](https://doi.org/10.1016/j.amjsurg.2017.03.043)

## Conference proceedings

1. **G. Jadick** and P. La Rivière. Optimization-based phase retrieval for material decomposition with multi-energy computed tomography. In *18th International Meeting on Fully 3D Image Reconstruction in Radiology and Nuclear Medicine*, May 2025. [doi:10.48550/arXiv.2508.12509](#)
2. **G. Jadick** and P. La Rivière. Accuracy of propagation-based phase-contrast CT under the projection approximation. In *8th International Conference on Image Formation in X-Ray Computed Tomography*, 2024. [doi:10.48550/arXiv.2508.12505](#)
3. **G. Jadick** and P. La Rivière. Modeling propagation-based x-ray phase-contrast imaging: validity of the projection approximation. In *Proc. Virtual Imaging Trials in Medicine*, pages 68–72, 2024. [doi:10.48550/arXiv.2405.05359](#)
4. **G. Jadick** and P. La Rivière. Cramér–Rao lower bound in the context of spectral x-ray imaging with propagation-based phase contrast. In *Medical Imaging 2024: Physics of Medical Imaging*, volume 12925. SPIE, 2024. [doi:10.1117/12.3006282](#)
5. **G. Jadick**, I. Reiser, and P. La Rivière. Sensitivity analysis of dual-energy computed tomography multi-triplet material decomposition. In *Medical Imaging 2024: Physics of Medical Imaging*, volume 12925. SPIE, 2024. [doi:10.1117/12.3006548](#)
6. H. DeBrosse, **G. Jadick**, L. Meng, and P. La Rivière. Comparing x-ray fluorescence emission tomography and computed tomography: contrast-to-noise ratios in a numerical mouse phantom. In *Medical Imaging 2024: Clinical and Biomedical Imaging*, volume 12930. SPIE, 2024. [doi:10.1117/12.3006795](#)
7. M. Ventura, **G. Jadick**, and P. La Rivière. Comparison of energy-integrating detectors and photon-counting detectors for MV-kV dual-energy imaging on a tomographic therapy system. In *Medical Imaging 2024: Physics of Medical Imaging*, volume 12925. SPIE, 2024. [doi:10.1117/12.3006854](#)
8. **G. Jadick** and P. La Rivière. Optimization of MV-kV dual-energy CT imaging for tomographic therapy. In *Medical Imaging 2023: Physics of Medical Imaging*, volume 12463, pages 557–566. SPIE, 2023. [doi:10.1117/12.2653674](#)
9. S. S. Shankar, **G. Jadick**, E. A. Hoffman, J. Atha, J. C. Sieren, E. Samei, and E. Abadi. Scanner-specific validation of a CT simulator using a COPD-emulated anthropomorphic phantom. In *Medical Imaging 2022: Physics of Medical Imaging*, volume 12031, pages 953–960. SPIE, 2022. [doi:10.1117/12.2613212](#)
10. F. Ria, **G. Jadick**, E. Abadi, J. B. Solomon, and E. Samei. Comparing two different noise magnitude estimation methods in CT using virtual imaging trials. In *Medical Imaging 2022: Physics of Medical Imaging*, volume 12031, pages 729–734. SPIE, 2022. [doi:10.1117/12.2612219](#)
11. E. Abadi, **G. Jadick**, C. McCabe, S. Sotoudeh, M. Fryling, B. Harrawood, E. Samei, S. Havadej, M. Sedlmair, J. Ramirez, and K. Stierstorfer. Development and application of a virtual imaging trial platform to evaluate and optimize state-of-the-art photon-counting CT. In *Radiological Society of North America Annual Meeting*, 2021
12. **G. Jadick**, E. Abadi, B. Harrawood, S. Sharma, W. P. Segars, and E. Samei. A framework to simulate CT images with tube current modulation. In *Medical Imaging 2021: Physics of Medical Imaging*, volume 11595, pages 22–30. SPIE, 2021. [doi:10.1117/12.2580983](#)
13. E. Abadi, **G. Jadick**, E. A. Hoffman, D. Lynch, W. P. Segars, and E. Samei. COPD quantifications via CT imaging: ascertaining the effects of acquisition protocol using virtual imaging trial. In *Medical Imaging 2021: Physics of Medical Imaging*, volume 11595, pages 160–166. SPIE, 2021. [doi:10.1117/12.2581965](#)

## Oral presentations

1. **G. Jadick** and P. La Rivière. Material decomposition of weakly absorptive structures with spectral x-ray phase-contrast CT. In *IEEE Medical Imaging Conference*, November 2025. \*will present in November
2. **G. Jadick** and P. L. Rivière. A tale of two techniques: multi-energy versus multi-distance material decomposition with x-ray phase-contrast imaging. American Association of Physicists in Medicine, Midwest Chapter Meeting, April 2025. **\*2nd place, Young Investigator Symposium**
3. **G. Jadick** and P. La Rivière. Modeling propagation-based x-ray phase-contrast imaging: validity of the projection approximation. In *Proc. Virtual Imaging Trials in Medicine*, pages 68–72, 2024. [doi:10.48550/arXiv.2405.05359](#)
4. **G. Jadick** and P. La Rivière. Cramér–Rao lower bound in the context of spectral x-ray imaging with propagation-based phase contrast. In *Medical Imaging 2024: Physics of Medical Imaging*, volume 12925. SPIE, 2024. [doi:10.1117/12.3006282](#)
5. **G. Jadick** and P. L. Rivière. Dual energy CT imaging with a megavoltage spectrum. American Association of Physicists in Medicine, Midwest Chapter Meeting, April 2023. **\*2nd place, Young Investigator Symposium**
6. **G. Jadick**, E. Abadi, B. Harrawood, S. Sharma, W. P. Segars, and E. Samei. A framework to simulate CT images with tube current modulation. In *Medical Imaging 2021: Physics of Medical Imaging*, volume 11595, pages 22–30. SPIE, 2021. [doi:10.1117/12.2580983](#)

## Posters

1. **G. Jadick**, C. Riggs, and P. L. Rivière. Quantitative forward modeling of propagation-based x-ray phase-contrast imaging at clinical scale. In *American Association of Physicists in Medicine, Annual Meeting*, July 2025. **\*Blue Ribbon Poster**. URL: <https://aapm.confex.com/aapm/2025am/meetingapp.cgi/Paper/17710>
2. **G. Jadick** and P. L. Rivière. Material decomposition with propagation-based x-ray phase contrast: a comparison of multi-energy and multi-distance imaging. In *American Association of Physicists in Medicine, Annual Meeting*, July 2025. URL: <https://aapm.confex.com/aapm/2025am/meetingapp.cgi/Paper/18361>
3. **G. Jadick** and P. La Rivière. Optimization-based phase retrieval for material decomposition with multi-energy computed tomography. In *18th International Meeting on Fully 3D Image Reconstruction in Radiology and Nuclear Medicine*, May 2025. doi:10.48550/arXiv.2508.12509
4. **G. Jadick** and P. La Rivière. Accuracy of propagation-based phase-contrast CT under the projection approximation. In *8th International Conference on Image Formation in X-Ray Computed Tomography*, 2024. doi:10.48550/arXiv.2508.12505
5. **G. Jadick** and P. La Rivière. An estimation theory approach to assessing spectral x-ray phase-contrast imaging. In *Gordon Research Conference on Image Science*, June 2024
6. **G. Jadick**, I. Reiser, and P. La Rivière. Sensitivity analysis of dual-energy computed tomography multi-triplet material decomposition. In *Medical Imaging 2024: Physics of Medical Imaging*, volume 12925. SPIE, 2024. doi:10.1117/12.3006548
7. **G. Jadick** and P. La Rivière. Optimization of MV-kV dual-energy CT imaging for tomographic therapy. In *Medical Imaging 2023: Physics of Medical Imaging*, volume 12463, pages 557–566. SPIE, 2023. doi:10.1117/12.2653674
8. **G. Jadick**, M. Bartlett, M. Busch, and J. Socolar. The art and craft of saxophone mouthpiece design. Fortin Foundation Bass Connections Virtual Showcase, May 2020. **\*runner-up poster award**
9. **G. Jadick**, R. Garces, and C. Schmidt. Physiology of E. Coli bacteria in high external osmotic pressure. Conference for undergraduate women in physics at the University of Maryland, January 2020
10. **G. Jadick**. Gender representation in science policy: A study of Capitol Hill. Sigma Pi Sigma Physics Congress in Providence, RI, November 2019

## TEACHING EXPERIENCE

<b>Medical Physics Teaching Assistant</b>   <i>Graduate Program in Medical Physics, University of Chicago</i>	2022 – 2025
<ul style="list-style-type: none"> <li>• TA for the graduate classes “Mathematics for Medical Physics” (Autumn 2022), “Physics of Medical Imaging I” (Winter 2023), and “Physics of Medical Imaging III” (Summer 2025)</li> <li>• Led discussion sessions with short lectures, group problem solving, and <a href="#">interactive Jupyter Notebooks</a> to demonstrate concepts such as the 2D Fourier Transform and Radon Transform.</li> <li>• Graded and provided detailed feedback on homework assignments, lab reports, and final exams.</li> </ul>	
<b>qBio Bootcamp Teaching Assistant</b>   <i>Biological Sciences Division, University of Chicago</i>	2023
<ul style="list-style-type: none"> <li>• TA for the Quantitative Biology “qBio” bootcamp to teach coding principles to incoming biological sciences Ph.D. students using R.</li> <li>• Head TA for the image analysis workshop with Jasmine Nirody, Ph.D.</li> </ul>	
<b>“Introduction to Coding in Science” Instructor</b>   <i>Chicago EYES on Cancer, University of Chicago</i>	2023
<ul style="list-style-type: none"> <li>• Designed a <a href="#">four-part coding bootcamp</a> for high school and undergraduate summer research students to teach fundamentals of coding.</li> <li>• Taught basic principles (syntax, logic gates, etc.) and applications in data analysis and imaging.</li> </ul>	
<b>Physics Teaching Assistant</b>   <i>Department of Physics, Duke University</i>	2017 – 2020
<ul style="list-style-type: none"> <li>• Independently led labs and helped grading for introductory mechanics and E&amp;M courses.</li> <li>• Assisted in rapid transition of E&amp;M labs to a virtual format for summer 2020.</li> </ul>	
<b>Physics Community Outreach Volunteer</b>   <i>Physics Department, Duke University</i>	2017 – 2020
<ul style="list-style-type: none"> <li>• Performed basic physics demonstrations for gradeschool students at science fairs and field trips.</li> </ul>	
<b>House Course Student Instructor</b>   <i>Trinity College of Arts &amp; Sciences, Duke University</i>	2019 – 2020
<ul style="list-style-type: none"> <li>• Designed and taught two undergraduate courses after competitive proposal process.</li> <li>• “Physics for Everyone” on equity in STEM and best learning techniques.</li> <li>• “Physics in Cinema” exploring laws of physics through movie analysis.</li> </ul>	
<b>Math Teaching Assistant</b>   <i>Department of Mathematics, Duke University</i>	2020
<ul style="list-style-type: none"> <li>• Assisted students in the introductory calculus help room.</li> </ul>	
<b>Computer Science Teaching Assistant</b>   <i>Department of Computer Science, Duke University</i>	2017
<ul style="list-style-type: none"> <li>• Co-led weekly labs and graded exams for introductory computer science.</li> </ul>	

## LEADERSHIP EXPERIENCE

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<b>Chapter President</b>   <i>SPIE, University of Chicago Student Chapter</i>	2024 – present
<b>Director of Outreach</b>   <i>Diversity &amp; Outreach Committee, Medical Physics, University of Chicago</i>	2022 – 2025
<ul style="list-style-type: none"><li>• Led the medical physics graduate program's involvement in annual on-campus science fairs.</li><li>• Secured grant funding to design and build new <a href="#">CT</a>, <a href="#">MRI</a>, and radiation therapy demos.</li><li>• Organized students and faculty in drafting the program's 2022 Diversity Statement.</li><li>• Worked with Chicago Public Schools and UChicago Comprehensive Cancer Center to host professional learning days for physics teachers with research talks, outreach demos, and lab tours.</li><li>• Worked with UChicago Comprehensive Cancer Care Center to purchase a portable ultrasound for off-campus outreach presentations.</li><li>• Organized and delivered presentations at Lindblom Math &amp; Science Academy and Tilden High.</li></ul>	
<b>President</b>   <i>Graduate Program in Medical Physics, University of Chicago</i>	2022 – 2023
<ul style="list-style-type: none"><li>• Elected to serve as the primary liaison between medical physics students and faculty.</li><li>• Joined faculty meetings and organized regular meetings with the program director and students.</li><li>• Facilitated student initiatives: bi-weekly journal club, peer-mentor program, and office lunches.</li><li>• Led planning and coordination of the bi-annual retreat.</li></ul>	
<b>Chapter President</b>   <i>Society of Physics Students, Duke University</i>	2018 – 2020
<ul style="list-style-type: none"><li>• Reestablished the chapter, directed executive meetings, authored constitution and by-laws, secured funding, and designed website.</li><li>• Launched several projects including crash courses in Mathematica and MATLAB, career advising sessions, and community outreach.</li><li>• Won multiple National SPS awards (2019 Distinguished Chapter, 2020 Outstanding Chapter).</li></ul>	

## OTHER EXPERIENCE

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<b>Peer reviewer</b>   <i>Medical Physics</i>	2025 – present
<b>Peer reviewer</b>   <i>Journal of Medical Imaging</i>	2023 – present
<b>American Institute of Physics Mather Public Policy Intern</b>   <i>U.S. House of Representatives</i>	2019
<ul style="list-style-type: none"><li>• Rotated through subcommittees in the House Committee on Science, Space &amp; Technology.</li><li>• Researched upcoming hearing topics (deep sea exploration, renewable energy, artificial intelligence, etc.) and prepared briefs for members of Congress.</li><li>• Met with invited scientists, discussed their work, and observed their remarks in hearings.</li><li>• Collected demographic data of Capitol Hill briefings and analyzed results using text and regression analyses in Python, presented at the Society of Physics Students internship closing symposium.</li></ul>	
<b>Climate Policy Intern</b>   <i>Niskanen Center, Washington, DC</i>	2018
<ul style="list-style-type: none"><li>• Assessed and presented the merits of competing climate modeling techniques with thorough literature review.</li><li>• Designed interactive Bayesian belief networks in Python as tools to more intuitively interpret climate science research.</li></ul>	

## PROFESSIONAL AFFILIATIONS

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<b>IEEE, Institute of Electrical and Electronics Engineers</b>   <i>Student Member</i>	2025 – present
<b>University of Chicago Medicine Comprehensive Cancer Center</b>   <i>Trainee Associate Member</i>	2024 – present
<b>SPIE, International Society for Optics and Photonics</b>   <i>Student Member</i>	2021 – present
<b>American Association of Physicists in Medicine</b>   <i>Student Member</i>	2021 – present
<b>Pi Sigma Alpha, Political Science Honor Society</b>   <i>Member</i>	2020 – present
<b>Sigma Pi Sigma, Physics Honor Society</b>   <i>Member</i>	2019 – present

## SKILLS

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**Computational:** Bash, C/C++, CUDA, ImageJ, Git, L<sup>A</sup>T<sub>E</sub>X, Linux/Unix, Python, MATLAB, Mathematica, R

**Libraries:** Chromatix, CuPy, Jax, Pandas, NumPy, Matplotlib, Optax, PyCuda, SciPy

**Experimental:** CT, microscopy (DIC, confocal, AFM), micro-CT, electronics, misc. wet lab

**Interests:** Jazz saxophone, flamenco guitar, Spanish/Italian/Korean language, geography, political philosophy

*[CV compiled on August 22, 2025]*