

Alfredo Rates, Ph.D. Candidate

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Summary

I am an experimental physicist and I am looking for a postdoc position in the field of optical manipulation oriented for applications in bio-medicine. I am currently working as a Ph.D. candidate at the University of Twente, in the Complex Photonic Systems (COPS) Chair. My thesis is about light scattering, using the Wavefront Shaping technique and the Mutual Scattering effect. During my Ph.D. I learned that wavefront modulation has several applications. In particular, I studied applications in visible light communication, optical cloaking, and scattering characterization.

Education

- 2019-now **Ph.D. Candidate in optical physics**, *University of Twente*, Enschede, The Netherlands
Thesis topics: Light scattering, Wavefront Shaping, Mutual Extinction of light.
- 2018 - 2019 **Master Student of Electrical Engineering**, *Universidad de Chile*, Santiago, Chile
Thesis topics: Molecular electronics, nano-fabrication, artificial intelligence.
- 2013 - 2017 **Bachelor degree in Electrical Engineering**, *Universidad de Chile*, Santiago, Chile

Highlighted publications [see Google Scholar]

- 2022 **Scrambled and Unscrambled Optical Speckle with Multiple Scattering Layers: Applications to Optical Wireless Communication**,
Alfredo Rates, *J. Vreken, B. L. Mulder, W. L. IJzerman, and W. L. Vos*,
ArXiv, <https://doi.org/10.48550/arXiv.2210.08810>
- 2021 **Observation of mutual extinction and transparency in light scattering**,
Alfredo Rates, *A. Lagendijk, O. Akdemir, A. P. Mosk, and W. L. Vos*,
Phys. Rev. A **104** 043515, <https://doi.org/>
- 2018 **Unravelling the conductance path through single-porphyrin junctions**,
M. El Abbassi, P. Zwick, Alfredo Rates, D. Stefani, A. Prescimone, M. Mayor, H. S. J. van der Zant, and D. Dulić,
Chem. Sci. **10** 8299-8305, <https://doi.org/10.1039/C9SC02497B>
- 2016 **Fiber-base heterodyne infrared interferometry: an instrumentation study platform on the way to the Infrared Planet Formation Imager**,
F. E. Besser, Alfredo Rates, N. Ortega, M. I. Piña, C. Pollarolo, M. Romero, C. Yañez, M. Lasen, N. Ramos, and E. A. Michael,
Proc. SPIE 99072L, <https://doi.org/10.1117/12.2233687>

Supervised students

- 2021 **Bert L. Mulder**, *BSc*, Science & Technology Faculty, University of Twente
"Correlations in Scattering Diffusers for Li-Fi Technology"
- 2021 **Andrè de Mots**, *BSc*, Science & technology faculty, University of Twente
"High Precision Phase Measurement Setup for Mutual Extinction"

Teaching Assistant Experience

- 2019-2023 **Nanophotonics**, *course*, Science & Technology Faculty, University of Twente
Course focused on the most important aspects of photonics at the nanoscopic scale, with topics such as photonic crystals, light scattering, and diffusion.

- 2022 **Nanophotonics Experiments**, *laboratory*, Science & technology faculty, University of Twente
Follow-up of Nanophotonics, where students work in the optical laboratory in a semi-supervised environment.
- 2016 **Optics and Photonics Devices**, *course*, Electrical Engineering Department, Universidad de Chile
Course focused on the more common optical elements in linear optics experiments along with the generation and detection of light and, in particular, single photons.
- 2016 **Electronic and Analogue Circuits**, *laboratory*, Electrical Engineering Department, Universidad de Chile
Course focused on semiconductor-based circuit elements, such as diodes and transistors. This course is not only theoretical but also includes experimental activities based on the design and implementation of electronic circuits.

Extracurricular activities

- 2023 **Weekly colloquium COPS-W**, *Organizer*, Complex Photonic Systems (COPS) group
Organizer of the hybrid colloquium of the COPS group, where international speakers give a 1-hour talk about any topic related to nanophotonics.
- 2021-2023 **OPTICA (ex OSA) Student Chapter**, *President*, Science & Technology Faculty, University of Twente
I Initiate as Vice-president and then as president of the chapter. As part of the board we organize events such as visits to companies, talks from scientists, women in STEM, etc. I was also in charge of social media profiles.
- 2017-2018 **IEEE Student Chapter**, *President*, University of Chile
Revival of the Student Chapter at the University. When part of the board I mostly focused on pushing forward personal student projects in electronics such as tiny robots and wireless communication.

Skills

- Software** *Matlab, Python, LabVIEW, C#, Microsoft Office, Adobe Illustrator, Adobe Premiere, Inventor, SolidWorks, WordPress, HTML+CSS*
- Experiments** *Free-space optics, Protoboard electronics, Arduino, 3D printing, Soldering operations.*
- Fabrication** *Wetbench operations, e-beam lithography, reactive ion etching, scanning electron microscopy.*
- Languages** *Spanish (Native), English (Advanced), Dutch (Intermediate), Portuguese (Basic).*
- Social skills** *Interdisciplinary team work, Resilient, Enthusiastic, Eager to learn.*

References

Willem L. Vos *Full professor*
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