

Curriculum vitae

Ricardo Avelar Sotomaia Karam

Associate Professor – Department of Science Education – University of Copenhagen

Born: 22/05/1979 in Brazil Married, 2 children Hobby: Kitesurf

Education

- PhD in Physics Education (2012), University of São Paulo and Technical University of Dresden
- Master's degree in Physics Education (2005), Federal University of Santa Catarina
- BSc in Mathematics and Physics Education (2003), Pontifical Catholic University of Paraná
- BSc in Civil Engineering (2002), Federal University of Paraná

Academic positions

- Associate Professor, Department of Science Education, University of Copenhagen, 2014-pres
- Postdoctoral Fellow (Humboldt Foundation), University of Hamburg, 2012-2014
- Assistant Professor of Mathematics, Federal Institute of Science and Technology, 2007-2009
- Assistant Professor of Physics, Federal University of Santa Catarina, 2004-2006
- Mathematics and Physics high school teacher, Dom Bosco school, 2000-2004

Selected relevant activities

- Director of the IHPST council (2015-2019)
- Member of the Editorial Board of the journal *Science & Education* (2015-pres.)
- Leader of the research group on Didactics of Physics, Department of Science Education, University of Copenhagen (2015-2022)
- Responsible for the courses History of Physics and History of Quantum Mechanics at the University of Copenhagen
- Guest editor of the thematic issue "The Interplay of Physics and Mathematics: Historical, Philosophical and Pedagogical Considerations" for the journal *Science & Education*
- Guest editor of the thematic issue "Mathematik im Physikunterricht" for the journal *Unterricht Physik*, dedicated to German physics teachers
- Member of the International Scientific Committee of IHPST, GIREP and WCPE conferences
- Reviewer for the journals PR-PER, AJP, EJP, Science & Education, RBEF, CBEF and EJMSTE

Selected research grants

- VELUX visiting professor for Andrea diSessa (2015)
- Postdoctoral Fellow of the Humboldt Foundation (2012-2014)
- PhD grant from FAPESP (2011-2012) and CAPES-DAAD (2010-2011)

Research stays abroad

- Visiting scholar at UC San Diego, Craig Callendar, 11.-12.2022
- University of Hamburg, Dietmar Höttecke, 8.2012-8.2014
- University of Helsinki, Ismo Koponen, 3.2013 - 5.2013
- Technische Universität Dresden, Gesche Pospiech, 3.2010-3.2011
- University of Maryland, Edward Redish, 4.2011
- University of Oslo, Carl Angell, 9.2010

Research focus

Educational implications of the interplay between physics and mathematics. Physics education at university level. History of physics and its didactical potential.

Publications and presentations

Author of several peer-reviewed papers in international journals of science (mainly physics) education. Guest editor of two special issues on the relationship between physics and mathematics, one in English (Science & Education) and one in German (Unterricht Physik). Contributor to a large number of international conferences on physics education and history of physics in Europe, South America, and Asia. More than 20 invited talks.

Supervision

Supervised 8 MSc students (3 in Germany, 5 in Denmark), 2 PhD students (ongoing) and 1 Postdoc.

10 most relevant publications

Lima, N., **Karam, R.** (2021) Particle velocity = group velocity: A common assumption in the different theories of Louis de Broglie and Erwin Schrödinger. *American Journal of Physics*, 89(5), 521.

Karam, R. (2020). Schrödinger's original struggles with a complex wave function. *American Journal of Physics*, 88(6), 433. Featured.

Karam, R. (2020). Why are complex numbers needed in quantum mechanics? Some answers for the introductory level. *American Journal of Physics*, 88(1), 39.

Karam R., Uhden O., Höttecke D. (2019) The “Math as Prerequisite” Illusion: Historical Considerations and Implications for Physics Teaching. In: Pospiech G., Michelini M., Eylon BS. (eds) *Mathematics in Physics Education*. Springer, Cham.

Karam, R. (2018). What distinguishes the Feynman lectures from traditional physics textbooks? *Brazilian Journal of Physics Education (RBEF)*, 40 (4).

Karam, R. (2018). Fresnel's original interpretation of complex numbers in 19th century optics. *American Journal of Physics*, 86, 245. Editor's pick, most downloaded paper of the issue.

Karam, R., Kneubil, F. & Robilotta, M. (2017). Forces on a current-carrying wire in a magnetic field: the macro-micro connection. *European Journal of Physics*, 38(5).

Karam, R., Krey, O. (2015). Quod erat demonstrandum: Understanding and Explaining Equations in Physics Teacher Education. *Science & Education*, 24(6), 661-698.

Karam, R. (2014). Framing the structural role of mathematics in physics lectures: A case study on electromagnetism. *Phys. Rev. Phys. Educ. Res* **10**, 010119.

Uhden⁺, O., **Karam⁺, R.**, Pietrocola, M., Pospiech, G. (2012). Modelling Mathematical Reasoning in Physics Education. *Science & Education*, 20(4), 485-506. ⁺ Both authors contributed equally.