Richard N. Steinberg

School of Education • City College of New York • New York, NY 10031
Department of Physics • City College of New York • New York, NY 10031

212 650-5698 (office) • steinberg@ccny.cuny.edu

Field of interest

Science, physics education: research and development aimed at improving how students learn physics/science; innovative instruction; teacher education; outreach.

Education

Teacher Certification, City College of New York (2007)
Ph.D., Applied Physics, Yale University (1992)
Teacher Certification, Teacher Preparation Program, Yale University (1992)
M.S., Physics, Yale University (1987)
B.S., Physics and Mathematics, State University of New York at Binghamton (1986)

Professional experience

1999 – present:
City College of New York School of Education and Department of Physics
The City University of New York Graduate Center Program in Physics:
Professor (2005 – present)
Program Director, Science Education Program (1999 – 2021)
Undergraduate major advisor, Physics Department (2013 – present)
Associate Professor (1999 – 2004, with tenure starting 2004)

2007 – 2008: *Frederick Douglass Academy*, H.S. Science Teacher (full time while on sabbatical)

2006 – 2007: *High School for Math Science and Engineering*, Physics Teacher (part time)

1995 – 1999: *University of Maryland*, National Academy of Education Spencer Postdoctoral Fellow and Research Associate, Physics Education Research Group

1992 – 1995: *University of Washington*, Research Associate, Physics Education Group

Professional Honors, Awards, and Recognitions

2024: Alfred & Miriam Weiss Award for Excellence in Teaching

2017: Recipient of the PhysTEC 5+ award on behalf of City College of New York

2015: Fellow of the American Physical Society "For contributions to understanding the teaching and learning of physics ranging from elementary school science to quantum mechanics and for using physics education research to improve K-16 instruction"

2014: City College of New York Provost's Prize for Pedagogical and Curricular Innovation

2012: Director of one of 11 "Outstanding physics teacher education programs" in the nation identified by APS/AAPT/AIP sponsored Task Force on Teacher Education in Physics

2004: City College of New York Teacher of the Year

1998 – 2000: National Academy of Education Spencer Postdoctoral Fellowship

Summary of work

Professor and Program Director of Science Education, School of Education

- Director of program (1999-2021) that has had 10 full time faculty, dozens of adjunct faculty, and dozens of staff and ongoing collaboration with New York City Department of Education
- Program advisor for over 1000 Science Education candidates in middle and secondary science education
- Lead preparer of registration / re-registration of middle and secondary science education programs (which includes biology, chemistry, earth science, and physics)
- Lead preparer of NCATE and CAEP accreditation reports for middle and secondary science education programs
- Committee member and/or chair on numerous committees including Executive, Curriculum, Tenure/Promotion, and Search Committees
- Instructor of Science Education courses, field supervisor of student teachers, faculty advisor of Masters Research projects
- Creator of new program in middle school science teacher education
- Co-creator of new undergraduate program "Science Learning and Public Engagement"
- Course Developer of new courses in elementary (SCI 12400: *Principles of Physical Science*), middle school (SCI 1403E / 1404E: *Physical Science for Middle School Teachers* parts 1 and 2), and secondary (PHYS 1401E / 1402E: *Development of Knowledge in Physics* parts 1 and 2; PHYS 7405N: *Understanding Electricity and Magnetism*; EDSE 7202I: *Master's Project: Science*) science education

Professor and Undergraduate Advisor, Physics / Division of Science

- Program advisor for dozens of undergraduate physics majors
- Supervisor of Physics Ph.D. in Physics Education Research
- Instructor of introductory, intermediate, and Masters level courses and laboratories in Physics; instructor of general education courses in physics; instructor in summer college physics programs for high school students
- Course Developer: FIQWS 10011: *Understanding Science through understanding the universe*; PHYS 31406: *Understanding Science: Optics*; PHYS 31407: *Understanding Science: Astronomy*.
- Committee member and/or chair on numerous committees including Curriculum, Lab, Tenure/Promotion, Search, and Divisional Teaching and Learning Committees

Researcher / Scholar

- Director or co-director of science education projects funded by the National Science Foundation, the Fund for the Improvement of Postsecondary Education, the National Academy

of Education, PSC-CUNY, and New York State Department of Education totaling over $9M (68% as Project Director).

- Author of more than 35 scholarly publications (research, curriculum, software) and presenter of more than 65 keynote / invited presentations on the teaching and learning of science ranging from elementary school science to quantum mechanics.

Service to College

- *Administration Appointments*: Member and/or chair on numerous committees including Strategic Planning (multiple), Associate Provost for Research Search, Dean Search (3 different divisions), General Education (CUNY-wide and CCNY), Honors College Admissions, and Awards (multiple) Committees; College Academic Integrity Officer
- *Elected Appointments*: Faculty Senator, Faculty Senate Executive Committee Member, College of Liberal Arts and Sciences Faculty Council Member, Union Delegate, and Chair of College-wide General Education Committee
- Presenter of Family Science Day, CUNY week open house laboratory tours, Physics majors month
- Lead organizer and presenter, extended workshops for Science Ph.D. candidates on the teaching and learning of science

Service to Community

- Editor of American Physical Society Forum of Education Newsletter (2016-2019)
- Founder and presenter of *Physics Outreach Program*: educational, interactive demonstrations for pre-K through secondary schools, presented at local schools and CCNY
- Committee member and/or chair on numerous committees of American Association of Physics Teachers and American Physical Society
- Peer reviewer, National Science Foundation, *American Journal of Physics*, *Physical Review Special Topics – Physics Education Research*, *The Physics Teacher*, PhysTEC comprehensive site proposals
- External reviewer of numerous promotion and tenure review actions
- Workshop presenter in multiple conferences, organizations, and New York City Department of Education events
- Conference organizer of *Physics Education Research and Teacher Education*, sponsored by AAPT, University of Guelph, (www.sci.ccny.cuny.edu/~rstein/perc2000.htm): invited presenters from 5 countries, 14 states, and the District of Columbia (August 2000)

Sample Synergistic Projects

- Project Director of $3.14M New York City-wide Secondary School Science Professional Development Project sponsored by multiple grants through the New York State Department of Education (2012-2020). Project was a collaboration with NYC Department of Education to support in-service teachers throughout NYC where 288 teachers were directly supported

through extended course work / workshops in science at City College of New York, were provided with over $87,000 worth of science classroom supplies, and were supported in their classrooms implementing inquiry science activities.

- Principal Investigator of $2.5M NSF project for recruitment and development of science majors interested in becoming science teachers in NYC (2006-2013). Project was a collaboration of City College of New York (Science and Education), New York Hall of Science, and Center for Advanced Studies in Education (CUNY Graduate Center) and served over 60 science teacher candidates. Results include 5 publications, 15 presentations, and contribution to a Ph.D. thesis in science education. Research indicated that CLUSTER graduates teaching in science classrooms outperformed the more experienced control group teachers. The impact of CLUSTER includes the development of an Informal Science Education Program at CCNY which is integrated with the Teacher Education Program.
- Co-Principal investigator and Project Director of $928K project sponsored by NSF and FIPSE for development and dissemination of interactive quantum mechanics curriculum (1997-2004). Curriculum was based on research on student learning, used advances in technology, and integrated applications of quantum technology. Results of gains in student learning and retention and impact on the greater community were overwhelmingly positive. There were 8 peer-reviewed publications, 3 invited papers, 50 invited presentations, 13 workshops presented, and 3 Ph.D. dissertations. A CD that serves as a resource for instructors was completed and 2 student workbooks were published by John Wiley & Sons. Curricula were disseminated to over 200 institutions in 22 countries, 34 states, and Washington DC.

Teaching experience

- College instructor, education and science courses for pre- and in-service elementary, middle, and high school teachers
- College instructor, introductory and advanced physics courses and laboratories
- College instructor, science courses for students meeting general education requirements
- College instructor, science for under-prepared minority students
- Mentor, Ph.D. physics thesis work in physics education research
- Mentor, Master's and undergraduate student research projects
- Supervisor, student teaching
- Supervisor, student-teacher research projects
- Supervisor, teaching assistant training seminar
- Instructor of high school students, summer programs for gifted science and math students
- Teacher, high school science

Sample funded scholarship

- "Interventions to improve video-based learning and the role of attentional engagement," L. Parra et al. (including R.N. Steinberg as Senior Personnel) NSF DRL- 2201835 (2022-present).

- "The New York City-wide Grades 2-8 Science Professional Development Project," New York City Department of Education in collaboration with City College of New York (CCNY project director: R.N. Steinberg), New York State Department of Education, Mathematics and Science Partnership Grants, ($800K for CCNY, 2018-2019).
- "The Hispanic Alliance for the Graduate Education and the Professoriate on Environmental Sciences and Engineering," J.E. Gonzalez et al. (including R.N. Steinberg as Senior Personnel) NSF AGEP Award HRD –1723209 (2018-2021).
- "Assessing student attentional engagement from brain activity during STEM instruction," L. Parra and R.N. Steinberg, National Science Foundation, DRL-1660548 ($709K, 2017-2022).
- "A collaborative teacher professional development project to improve secondary science education in New York City," R.N. Steinberg, I. Salame, Y. Wyner, and G. Borman, New York State Department of Education, Teachers Leader Quality Partnership, TLQP 0247-15-0002 ($517K, 2015-2018).
- "The New York Citywide Middle School Science Professional Development Project," New York City Department of Education in collaboration with City College of New York (CCNY project director: R.N. Steinberg), New York State Department of Education, Mathematics and Science Partnership Grants, ($1.72M for CCNY, 2014-2017).
- "A collaborative teacher professional development project to improve middle school science education in New York City," R.N. Steinberg, I. Salame, and G. Borman, New York State Department of Education, Teachers Leader Quality Partnership, TLQP 0247-12-0002 ($104K, 2012-2015).
- "The Phase I Robert Noyce Scholarship Program at CCNY: Expanding the Teacher Academy Program for STEM Education in Urban Schools," D. Stylianou, Y. Wyner, I. Salame, and R.N. Steinberg, National Science Foundation, DUE-1245037 ($1.2M, 2012-2018).
- "A School-College Learning Community to Improve Science Teaching and Learning in Grades 5-9," F. Raia, G. Borman, and R.N. Steinberg, New York State Department of Education, Teachers Leader Quality Partnership, TLQP- 50089-00 09 ($35K, 2009-2010).
- "Utilizing Computer Technology in an Introductory Physics Course with a Diverse Student Body," J. Tu, R.N. Steinberg, M. Lubell, M. Lenzner, and C. Meriles, Hewlett Packard ($118K, 2007-2009).
- "CLUSTER: Investigating a new model partnership for teacher preparation," R.N. Steinberg, F. Raia, B. Flugman, B. Schroder, and P. Gupta, National Science Foundation, TPC-055269 ($2.5M, 2006-2013).
- "The Middle School Science Consortium," F. Raia and R.N. Steinberg, NY State Education Department- Teacher Opportunity Corps, TOC 0520-04-0002 ($180K, 2003-2008).
- "Physics education research-based reform at a multicultural institution," R.N. Steinberg, National Science Foundation, DUE-0310799 ($110K, 2003-2006).
- "The TOC Science Collaborative," F. Raia and R.N. Steinberg, New York State Department of Education ($74K, 2003-2005).

- "Redefining the teaching of applied quantum physics through the dissemination of a proven reform," R.N. Steinberg and M.C, Wittmann, Department of Education FIPSE grant P116B000300 ($298K, 2000-2004).

Sample Publications

- "Effect of explanation videos on learning: The role of attention and academic performance," Adler, M.V., Madsen, J., Hedberg, J., Steinberg, R, and Parra, L, *Educ Inf Technol* (2025). https://doi.org/10.1007/s10639-024-13292-9
- "Synchronized eye movements predict test scores in online video education," Jens Madsen, Sara U. Júlio, Pawel J. Gucik, Richard Steinberg, Lucas C. Parra, Proceedings of the National Academy of Sciences, 118 (5) e2016980118; DOI: 10.1073/pnas.2016980118 (Feb 2021). https://www.pnas.org/doi/10.1073/pnas.2016980118
- "A college-science center partnership for science teacher preparation," R.N. Steinberg and L.J. Saxman, *Innovations in Science Teacher Education*, **2**(3) (2017). https://innovations.theaste.org/a-college-science-center-partnership-for-science-teacher-preparation/
- "Arnold Arons and changing the way to learn to learn the way to teach," T. Kolozian and R.N. Steinberg, invited article in *Forum on Education Newsletter*, American Physical Society (Summer, 2016). https://engage.aps.org/fed/resources/newsletters/newsletter-archive/summer-2016
- "Targeted courses in inquiry science for future elementary school teachers," R.N. Steinberg, Y. Wyner, G. Borman, and I. Salame, *Journal of College Science Teaching* **44**, 48-53 (2015). http://education.ccny.cuny.edu/website/faculty/rsteinberg/jcst1506_51.pdf
- "Making sense of how students interpret atomic representations," I.I. Salame, S. Sarowar, S. Begum, and R.N. Steinberg, *Journal of Academic Perspectives* **14** (2014).
- "Understanding and affecting science teacher candidates' scientific reasoning in introductory astrophysics," R.N. Steinberg and S. Cormier, *Phys. Rev. ST Phys. Educ. Res.* **9**, 020111 (2013). https://journals.aps.org/prper/abstract/10.1103/PhysRevSTPER.9.020111
- "Where the rubber meets the road," R.N. Steinberg, *The Huffington Post*, http://www.huffingtonpost.com/richard-steinberg/post_2880_b_1217235.html (2012).
- "An inquiry into science education, where the rubber meets the road," R.N. Steinberg, Rotterdam, NL: Sense Publishing (2011) https://link.springer.com/book/10.1007/978-94-6091-690-8.
- "The twin twin paradox: Exploring student approaches to understanding relativistic concepts," S. Cormier and R.N. Steinberg, *Phys. Teach.* **48**, 598-601 (2010). https://pubs.aip.org/aapt/pte/article-abstract/48/9/598/276053/The-Twin-Twin-Paradox-Exploring-Student-Approaches?redirectedFrom=fulltext
- "CLUSTER: University-Science Center Partnership for Science Teacher Preparation," L.J. Saxman, P. Gupta, and R.N. Steinberg, *The New Educator* **6**, 280-296 (2010). https://www.tandfonline.com/doi/abs/10.1080/1547688X.2010.10399606

- "Probing student understanding of scientific thinking in the context of introductory astrophysics," R.N. Steinberg, S. Cormier and A. Fernandez, Phys. Rev. ST Phys. Educ. Res. **5**, 020104 (2009). https://journals.aps.org/prper/abstract/10.1103/PhysRevSTPER.5.020104
- "Away from the ivory tower: Real challenges teaching high school physics in an urban environment," R.N. Steinberg, invited article in *Forum on Education Newsletter*, American Physical Society (Fall, 2008).