

Bradley "Peanut" McCoy, Ph. D.

Professor and Chair

Department of Mathematics, Physics, and Statistics

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Education

University of Minnesota Minneapolis, MN Doctor of Philosophy, Physics	2001-2007
California Institute of Technology Pasadena, CA Bachelor of Science, Physics	1997-2001

Teaching Experience

Azusa Pacific University Azusa, CA	2007-Present
Ridgewater College Wilmar, MN	2007

Awards

Faculty Uncommon Citizen Award	2018
University Leadership Award	2015

Courses Taught

Physics for Life Sciences I
 Physics for Life Sciences II
 Physics for Science & Engineering I
 Physics for Science & Engineering II
 Physics for Science & Engineering III
 Thermodynamics
 Quantum Mechanics
 Mathematical Methods for Physics & Engineering
 Physics Seminar
 Physics Research Seminar
 Physics Thesis
 Physical Science
 Introduction to Astronomy
 Earth Science
 Earth Science Concepts & Applications
 First-Year Seminar
 Writing 2: Scientific Writing
 Nature (Honors)
 Assorted labs

Curriculum Development

Courses created
 Physical Science for Teachers
 Science and Technology for Everyday Applications
 Teaching and Learning Physics
 Readings for Teaching Physics
 Physics Teaching Practicum
 Physics for Science & Engineering III

Physics Research Seminar
 Physics Thesis
 Quantum Mechanics
 Writing 2: Scientific Writing

Lab manuals written

Earth Science
 Physics for Difference Makers
 Physics for Life Sciences I & II (for face-to-face and online)
 Physics for Science & Engineering I & II (for face-to-face and online)
 Honors Nature

Committees & Service

General Education Council (2009-2018, chair 2011-2014)
 Interim Director of General Education (2014-2015)
 General Education Curriculum Committee (chair 2015-2018)
 General Education Assessment Committee (chair 2010-2011)
 General Education Curriculum Design Committee (2014-2015)
 Writing Committee (2014-2015)
 Undergraduate Writing Program Advisory Board (2015-present)
 Writing Across the Curriculum Committee (2015-2018)
 Writing Program Special Assistant (January 2017–May 2018)
 General Education-Student Life Task Force (2013-2015)
 General Education-School of Theology Task Force (2014-2015)
 General Education-Diversity Task Force (2014-2015)
 Undergraduate Studies Council (2014-2015)
 American Association of Physics Teachers, Southern California Section (Vice-president for Universities 2014-2017, Section Representative 2018-2020)
 American Association of Physics Teachers, History & Philosophy Committee (2017-2020)
 Department Chair, Department of Mathematics, Physics, and Statistics (2019-present)

Grants

Pilot Study for the Effectiveness of Learning Assistants on Student Engagement
B. K. McCoy, E. Roth, T. Allbaugh, S. McCathern, M. Saleh, K. Huang
 APU President's Scholarship Enhancement Grant \$30,000 (2021)

STEM Excellence Learning (STEMEL) Community Scholars
 H.-J. Yeh (PI) and B. K. McCoy (co-PI)
 National Science Foundation \$650,000 (2021-2026)

Publications

Color-coded Algebra
B. K. McCoy, *The Physics Teacher*, **59**, 206 (2021)

Effects of Faith Integration Activities on Students' Epistemologies in Introductory Physics Classes
B. K. McCoy, *Christian Higher Education*, **19**, 1-15, (2020)

Good Problems Within and Across Disciplines
 D. Reinholz, T. Slominski, T. French, S. Pazicni, C. Rasmussen, and B. McCoy, *Journal of Research in STEM Education*, **4** (1), 37-53 (2018)

Liquid Crystal Mesophases Beyond Commensurate Four-layer Periodicity
 C. C. Huang, Shun Wang, LiDong Pan, Z. Q. Liu, B. K. McCoy, Yuji Sasaki, Kenji Ema, P. Barois & Ron Pindak, *Liquid Crystal Reviews*, **3** (1), 58-78 (2015)

Developing a program-level faith integration curriculum: A case study from physics

B. K. McCoy, Christian Higher Education, **13** (5), 340-351 (2014)

Spontaneous and field-induced mesomorphism of a silyl-terminated bent-core liquid crystal as determined from second-harmonic generation and resonant x-ray scattering

C. Folcia, J. Orgega, J. Etxebarria, S. Rodriguez-Conde, G. Sanz-Enguita, K. Geese, C. Tschierske, V. Ponsinet, P. Barois, R. Pindak, Lidong Pan, Z. Q. Liu, B. K. McCoy, and C. C. Huang, *Soft Matter*, **10**, 196-205 (2013)

Resonant x-ray diffraction study of an unusually large phase coexistence in smectic liquid-crystal films

LiDong Pan, P. Barois, R. Pindak, Z. Q. Liu, B. K. McCoy, and C. C. Huang, *Phys. Rev. Lett.* **108**, 037801 (2012)

Effect of enantiomeric excess on the phase behavior of antiferroelectric liquid crystals

LiDong Pan, B. K. McCoy, Shun Wang, Z. Q. Liu, S. T. Wang, R. Pindak, and C. C. Huang, *Phys. Rev. E* **83**, 069906 (2011)

Surface and Bulk Uniaxial to Biaxial Smectic-A Transition in a Bent Core Liquid Crystal

LiDong Pan, B. K. McCoy, Shun Wang, Wolfgang Weissflog, and C. C. Huang, *Phys. Rev. Lett.* **105** 117802 (2010)

Evolution of a rare sequence of surface transitions with temperature and film thickness

B. K. McCoy, LiDong Pan, Z. Q. Liu, S. T. Wang, Shun Wang, J. W. Goodby, and C. C. Huang, *Phys. Rev. E* **18** 031712 (2010)

Nonplanar tilts in very thin smectic films of one liquid-crystal compound

B. K. McCoy, Z. Q. Liu, S. T. Wang, LiDong Pan, Shun Wang, J. W. Goodby, and C. C. Huang, *Phys. Rev. E* **79** 061702 (2009)

Recovery of a reversed phase sequence in one ternary liquid-crystal-mixture system

Shun Wang, LiDong Pan, B. K. McCoy, S. T. Wang, H. T. Nguyen and C. C. Huang, *Phys. Rev. E* **79** 021706 (2009)

Effects of doping on an unusual smectic- C^*_α -smectic- C^*_{FI2} -smectic- C^* phase sequence

B. K. McCoy, Z. Q. Liu, S. T. Wang, LiDong Pan, Shun Wang, H. T. Nguyen, R. Pindak and C. C. Huang, *Phys. Rev. E* **77** 061704 (2008)

Polarization studies of resonant forbidden reflections in liquid crystals

P. Fernandes, P. Barois, S. T. Wang, Z. Q. Liu, B. K. McCoy, C. C. Huang, R. Pindak, W. Caliebe, and H. T. Nguyen, *Phys. Rev. Lett.* **99** 227801 (2007)

Unique pitch evolution in the smectic- C^*_α phase

Z. Q. Liu, B. K. McCoy, S. T. Wang, R. Pindak, W. Caliebe, P. Barois, P. Fernandes, H. T. Nguyen, C. S. Hsu, Shun Wang, and C. C. Huang, *Phys. Rev. Lett.* **99** 077802 (2007)

Smectic- C^*_α phase with two coexistent helical pitch values and a first-order smectic- C^*_α to smectic- C^* transition

B. K. McCoy, Z. Q. Liu, S. T. Wang, R. Pindak, K. Takekoshi, K. Ema, A. Seed, and C. C. Huang, *Phys. Rev. E* **75** 051706 (2007)

Smectic- C^*_α – Smectic- C^* phase transition and critical point in binary mixtures

Z. Q. Liu, S. T. Wang, B. K. McCoy, A. Cady, R. Pindak, W. Caliebe, K. Takekoshi, K. Ema, H. T. Nguyen and C. C. Huang, Phys. Rev. E **74** 030702(R) (2006)

Optical studies on the surface-induced tilted layer in freestanding films of two no-layer-shrinkage liquid crystal compounds

S. T. Wang, X. F. Han, Z. Q. Liu, B. K. McCoy, and C. C. Huang, Phys. Rev. E **74** 031707 (2006)

Investigations of nanoscale helical pitch in smectic- C_α^* and smectic- C^* phases of a chiral smectic liquid crystal using differential optical reflectivity measurements

V. P. Panov, B. K. McCoy, Z. Q. Liu, J. K. Vij, J. W. Goodby, and C. C. Huang Phys. Rev. E **74** 011701 (2006)

Surface-induced multiple reentrant transitions

B. K. McCoy, Z. Q. Liu, S. T. Wang, V. P. Panov, J. K. Vij, J. W. Goodby and C. C. Huang, Phys. Rev. E **73**, 041704 (2006)

Optical and resonant x-ray diffraction studies confirm a SmC_{FI2}^* - SmC^* liquid crystal phase sequence reversal

S. T. Wang, Z. Q. Liu, B. K. McCoy, R. Pindak, W. Caliebe, H. T. Nguyen, and C. C. Huang, Phys. Rev. Lett. **96**, 097801 (2006)

Vibrating quartz crystal studies of wall-film superfluidity in liquid $^3\text{He}/^4\text{He}$ mixtures near the tricritical concentration

B. J. Andersson, W. Deng, J. Lee, B. K. McCoy and W. Zimmermann Jr., Jour. Low Temp. Phys. **134** 770 (2004)

Presentations

Most Valuable Cargo: The Tizard Mission in World War II (invited)

B. K. McCoy, American Association of Physics Teachers, summer National Meeting (2021)

Swarmnotes for Collaborative Note-taking: Logistics and Uses

B. K. McCoy, S. Petry, N. Tamminga, and B. Christensen, American Association of Physics Teachers, summer National Meeting (2021)

Swarmnotes for Collaborative Note-taking: Student Perspectives

S. Petry, B. K. McCoy, B. Christensen, and N. Tamminga American Association of Physics Teachers, summer National Meeting (2021)

Effects of faith integration discussions on students' understandings of science

B. K. McCoy, American Scientific Affiliation, national meeting (2021)

Effects of Faith Integration Discussions on Students' Understandings of Science

B. K. McCoy, American Scientific Affiliation, national meeting (2016)

Landscape of PhysTEC in Southern California

S. Callori and B. K. McCoy, American Association of Physics Teachers, Southern California section meeting (2021)

Novel Technological Approach for Collaborative Student Notes

S. Petry, B. K. McCoy, B. Christensen, and N. Tamminga, American Association of Physics Teachers, Southern California section meeting (2021)

The Troublesome Tides

B. K. McCoy, American Association of Physics Teachers, winter National Meeting (2021)

Paris, Descartes, Newton, and the Void

B. K. McCoy, American Association of Physics Teachers, summer National Meeting (2020)

Implementing and Assessing Writing Across the Physics Curriculum (Workshop)

B. K. McCoy, American Association of Physics Teachers, winter National Meeting (2020)

More Writing Practice in Lab with Less Grading

B. K. McCoy, American Association of Physics Teachers, Southern California section meeting (2019)

Exit Tickets for Formative Writing Practice

B. K. McCoy, American Association of Physics Teachers, summer National Meeting (2019)

Challenge Problems: Reasons for Student Choices

B. K. McCoy, American Association of Physics Teachers, Southern California section meeting (2019)

Epistemological Discussions on Characteristics of Scientists Help At-Risk Students

B. K. McCoy, American Association of Physics Teachers, summer National Meeting (2019)

Effective and Efficient Feedback on Lab Reports Using Video Comments

B. K. McCoy, American Association of Physics Teachers, winter National Meeting (2019)

Connecting Writing in Physics to General Education Writing Courses

B. K. McCoy, American Association of Physics Teachers, summer National Meeting (2018)

Principles for Successful Community-based General Education Reform

B. K. McCoy, Point Loma Nazarene University colloquium (2017)

Characteristics of Scientists and Analogous Traits of Christians

B. K. McCoy, American Association of Physics Teachers, summer National Meeting (2017)

Improved Epistemology Through Discussions on Characteristics of Scientists

B. K. McCoy, American Association of Physics Teachers, summer National Meeting (2017)

Scaffolding for Scientific Thinking in Non-Quantitative Classes

B. K. McCoy, Breaking Boundaries (2017)

Intervention to Prevent Degradation of Students' Epistemologies

B. K. McCoy, American Association of Physics Teachers, Southern California section meeting (2016)

A Tale of Two Proposals: Principles for Successful GE Reform

B. K. McCoy and B. Lamkin, Association for General and Liberal Studies, national meeting (2016)

How Faith Integration Can Help Students Learn Science

B. K. McCoy, American Scientific Affiliation, national meeting (2016)

Strategies for Encouraging Qualitative Thinking During Problem Solving

B. K. McCoy, American Association of Physics Teachers, summer National Meeting (2014)

Modelling and Incentivizing Qualitative Thinking

B. K. McCoy, American Association of Physics Teachers, Southern California section meeting (2014)

Connecting Epistemology to Students' Religious Beliefs

B. K. McCoy, Physics Education Research Conference (2013)

Why do Faith Integration? A Pedagogical Motivation

B. K. McCoy and J. Groth-Olson, American Scientific Affiliation Southern California Section Meeting (2013)

Outlining a Physics Faith Integration Curriculum

B. K. McCoy, T. Heumier, and C. Bassey, American Scientific Affiliation National Meeting (2012)

Problem Solving and Epistemology in Nonquantitative Introductory Science Classes

B. K. McCoy, American Association of Physics Teachers Summer National Meeting (2011)

Epistemological Effects of a Problem Solving Approach in Nonquantitative Introductory Science Classes

B. K. McCoy, American Physical Society April Meeting (2011)

Problem Solving without the Problems: Training for Scientific Thinking in Conceptual Classes

B. K. McCoy, American Association of Physics Teachers, Southern California section meeting (2010)

Probing the Elusive Orientational Degree of Freedom in Liquid Crystal Molecules

B. K. McCoy, National Synchrotron Light Source at Brookhaven National Laboratory (2006)

Liquid Crystals from Optical Switches to Frustrated Mesophases

B. K. McCoy, Minnesota State University-Mankato, Department of Physics and Astronomy Colloquium (2006)

Detailed Characterization of Five Structure Transitions in one Liquid Crystal Compound

B. K. McCoy, Z. Q. Liu, S. T. Wang, V. P. Panov, J. W. Goodby and C. C. Huang; 2006 International Liquid Crystals Conference

Introductory Physics through Inquiry-based Labs

B. K. McCoy and B. Batell, Classrooms of the Future XI (2005)

Introductory Physics through Inquiry-based Labs

B. K. McCoy and B. Batell, Minnesota Area Association of Physics Teachers Spring Meeting 2005

Inquiry-based Honors Physics Labs

Peter Border, Brian Batell, and B. McCoy, ACM Siggraph 2005: Educators Program

Undergraduate Theses Mentored

Why High School Students Opt in or Out of Physics Courses

G. Herrera and B. K. McCoy (2019)

Validating a Rubric to Measure the Problem Solving Process

T. Tel and B. K. McCoy (2019)

Students' Perceptions of the Goals of Physics Lab Across Different In-Person and Online Lab Sections Due to COVID-19

N. Tamminga and B. K. McCoy (2020)

Associations

American Physical Society

American Association of Physics Teachers

Physics Teacher Education Coalition