

Jennifer K. Knight

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Education

B.A. 1989	Cornell University	Biology (Neurobiology and Behavior)
Ph.D. 1994	University of Michigan	Neuroscience, with Pamela Raymond (Development of the goldfish visual system)
Post Doc 1995-1999	University of Colorado	Developmental Genetics, with W.B. Wood (Genetic control of gastrulation in <i>C. elegans</i>)

Academic Appointments

2015-present	Associate Professor	MCD Biology, University of Colorado
2005-2015	Senior Instructor	MCD Biology, University of Colorado
2006-2014	Coordinator	MCD Biology Science Education Initiative
2004-2005	Research Associate	Science Education, Carl Wieman
1999-2005	Instructor	MCD Biology, University of Colorado
1997	Lecturer	MCD Biology, University of Colorado

Honors, Awards and Fellowships

2018	Best Should Teach Gold Award for Excellence in Teaching
2015-2016	Boulder Faculty Assembly Leadership Institute Fellow
2016	Chancellor's Award for Excellence in STEM Education: <i>Student thinking about core physiology concepts across a physiology major</i> (with Katharine Semsar)
2010	Chancellor's Award for Excellence in STEM Education (<i>Developing a Capstone Assessment</i>)
2009	Mentor, Biology Scholars Research Residency Program (Scholarship of Teaching and Learning Institute, American Society for Microbiology)
2008	Biology Scholars Research Residency Program
2005	National Academies Education Mentor in the Life Sciences
2004	National Academies Education Fellow in the Life Sciences
2002, 2004	Dean's Fund for Excellence
2004	Council on Research and Creative Work (CRCW) Seed Grant
2001, 2002	Recognition of Influential Professors Award, Committee on Learning and Academic Support Services, University of Colorado.
1996-1998	American Cancer Society Postdoctoral Fellowship: <i>Cell determination in C. elegans</i> .
1995	National Institutes of Health Postdoctoral Fellowship: <i>Cell determination in C. elegans early embryos</i> .

Funding: Active

- 6/17-5/20: *Problem Solving Through Practice: Identifying Common Student Struggles in Solving Complex Biology Problems and Developing Tools to Drive Improvement*, PI. NSF DUE 1711348: \$299,718.
- 1/14-12/19: *Collaborative Research: Impact of the Summer Institutes on Faculty Teaching and Student Achievement*, PI. NSF DUE 1323019: \$476,146
- 9/13-8/19: *Collaborative Research: Expanding a National Network for Automated Analysis of Constructed Response Assessments to Reveal Student Thinking in STEM*, PI. NSF DUE 1323022: \$137,661

Funding: Completed

- 4/11-8/18: *Dissemination of Scientific Teaching through Summer Institutes*, PI. Regional Institute Director. HHMI 52007221: \$200,000
- 8/15-7/18: *Evaluating the Validity and Instructional Sensitivity of Concept Inventories in Biology*, Co PI. Keck Foundation: \$293,727
- 9/13-8/17: *Collaborative Research: Navigating from Vision to Change with Bio-MAPS*, PI. NSF DUE 1322364: \$153,236.
- 9/13-8/17: *Collaborative Research: A Community of Enhanced Assessment Facilitates Reformed Teaching*, PI. NSF DUE 1347729: \$55,056.
- 6/12-5/15: *Investigating Instructional Influences on the Productivity of Clicker Discussions*, PI. NSF DUE 1140789: \$196,627
- 9/10-8/14: *Collaborative Research: Automated Analysis of Constructed Response Concept Inventories to Reveal Student Thinking: Forging a National Network for Innovative Assessment Methods*, PI. NSF DUE 1022653 (CCLI Phase II Collaborative Proposal): \$84,529
- 6/10-5/11: Chancellor's Award for Excellence in STEM Education: *Development of a capstone concept assessment to measure learning and retention in graduating MCDB students*. \$9,000
- 7/02-6/03: Association of Biology Laboratory Educators Laboratory Initiative Grant: *Using C. elegans in undergraduate laboratories*. \$5000

Service (University of Colorado)

- 2014-present FTEP workshops (several per year)
- 2018-present Co-chair, Arts and Sciences Instructor Task Force
- 2017-present Boulder Faculty Assembly, MCDB Representative
- 2016 F, 2017 S Transforming Education, Stimulating Teaching and Learning Excellence (TRESTLE) Scholar Program: Faculty Leader
- 2016-2017 Campus Teaching and Learning Committee
- 2012-2014, 2015-present MCDB Teaching Evaluation Committee; chair 2018
- 2014-present MCDB Curriculum Committee
- 2013-present Boulder Faculty Assembly Instructor Affairs Committee
- 2013-present Fellow, Center for STEM Learning, University of Colorado, Boulder
- 2003-present Faculty Advisor, Alpha Epsilon Delta Pre-Health Honors Society
- 2003-2006, 2013 Pre-health Advisory Committee
- 2002-2015 MCDB Departmental Undergraduate Curriculum Committee (UGCOM)

Professional Service (external)

- 2017-present Genetics Society of America Education Committee member
- 2017-present Steering Committee member, Society for the Advancement of Biology Education Research (SABER)
- 2017-present Editor, CourseSource
- 2013-present Monitoring Editor, CBE-Life Sci Educ.
- 2012-2016 Chair, Abstract Committee, Society for the Advancement of Biology Education Research (SABER)
- 2013 Contributor, active learning exercises and videos, *Biology for a Changing World*
- 2013 National Academies Summer Institutes Workshop: Entering Biology Education Research
- 2012 National Academies Summer Institute Leadership Summit; Leader, Biology Education Research Group
- 2010 Founding member, Society for the Advancement of Biology Education Research (SABER)
- 2010 Leader, Biology Scholars Assessment Institute (American Society for Microbiology)
- 2009-2012 Faculty Workshop Leader, FIRST IV: Faculty Institutes for Reforming Science Teaching (NSF-funded professional development program for postdoctoral fellows)
- 2007, 2008 Contributor, assessment questions, Praxis Testing Services, Biology Education
- 2007 Contributor, clicker questions for 20 chapters of *Life*, 8e (Pearson)

2006-present Reviewer: Life Science Education (LSE), Journal of Microbiology and Biology Education, Journal of Science Education and Technology.

Publications

- Couch, BA, Wright CD, Freeman S, **Knight JK**, Semsar K, Smith MK, Summers MM, Zheng Y, Crowe AJ, Brownell SE (2019). GenBio-MAPS: A programmatic assessment to measure student understanding of *Vision and Change* core concepts across general biology programs. *CBE Life Sci. Educ.* 18:arx 1–14, doi: 10.1187/cbe.18-07-0117.
- Semsar K, Brownell SE, Couch BA, Crowe AJ, Smith MK, Summers MM, Wright CD, **Knight JK** (2018). Phys-MAPS: A programmatic physiology assessment for introductory and advanced undergraduates. *Adv Physiol Educ* 43: 15–27, 2019; doi:10.1152/advan.00128.2018.
- Durham MF, **Knight JK**, Bremers E, DeFreece J, Paine A, Couch BA (2018). Student, instructor, and observer agreement regarding frequencies of Scientific Teaching practices using the Measurement Instrument for Scientific Teaching-Observable (MISTO). *International Journal of STEM Research*.
- Pelletreau K, **Knight JK**, et al. (2018). A Faculty Professional Development Model That Improves Student Learning, Encourages Active-Learning Instructional Practices, and Works for Faculty at Multiple Institutions. *CBE Life Sci. Educ.* 17(2) doi.org/10.1187/cbe.17-12-0260.
- Summers MM, Couch BA, **Knight JK**, et al. (2018). EcoEvo-MAPS: An Ecology and Evolution Assessment for Introductory through Advanced Undergraduates. *CBE Life Sci. Educ* 17(2) doi.org/10.1187/cbe.17-02-0037.
- **Knight JK**, Brame CJ (2018). Evidence-Based Teaching Guides: Peer Instruction. *CBE Life Sci. Educ.* 17(2) doi.org/10.1187/cbe.18-02-0025.
- Shi J, **Knight JK**, Chun H, Guild NA, Martin JM (2017). Using Pre-Assessment and In-Class Questions to Change Student Understanding of Molecular Movements. *Journal of Microbiology & Biology Education* 18(1):18.1.3. doi:10.1128/jmbe.v18i1.1195.
- McCourt JS, Andrews TC, **Knight JK**, et al (2017). What Motivates Biology Instructors to Engage and Persist in Teaching Professional Development? *CBE Life Sci. Educ.* 16(3):ar54. doi:10.1187/cbe.16-08-0241.
- Durham MF, **Knight JK**, Couch BA (2017). Measurement Instrument for Scientific Teaching (MIST): A Tool to Measure the Frequencies of Research-Based Teaching Practices in Undergraduate Science Courses. *CBE Life Sci Educ* December 1, 2017 16:ar67. doi: 10.1187/cbe.17-02-0033.
- Pelletreau, K.N., Andrews, T., Armstrong, N., Bedell, M.A., Dastoor, F., Dean, N., Erster, S., Fata-Hartly, C., Guild, N., Greig, H., Hall, D., **Knight, J.K.**, Koslowsky, D., Lemons, P.P., Martin, J., McCourt, J., Merrill, J., Moscarella, R., Nehm, R., Northington, R., Olsen, B., Prevost, L., Stoltzfus, J., Urban-Lurain, M., and Smith, M.K. (2016). A clicker-based study that untangles student thinking about the processes in the central dogma. *Course Source Vol 3*.
- **Knight JK**, Wise SB, Sieke S (2016). Group random call can positively affect student in-class clicker discussions. *CBE Life Sci. Educ.* 15(4).
- Prevost LB, Smith MK, **Knight JK** (2016). Using student writing and lexical analysis to reveal student thinking about the role of stop codons in the central dogma. *CBE Life Sci. Educ.* 15(4).
- Batzli JM, **Knight JK**, Hartley LM, Cordero Maskiewicz A, Desy E (2016). Crossing the Threshold: Bringing Biological Variation to the Foreground. *CBE Life Sci. Educ.* 15(4).
- Couch BA, **Knight JK** (2015). A Comparison of Two Low-Stakes Methods for Administering a Program-Level Biology Concept Assessment. *JMBE* 16, 178-185.
- Couch BA, Brown TL, Shelpat TJ, Graham MJ, **Knight JK**. (2015) Scientific Teaching: Defining a Taxonomy of Observable Practices. *CBE Life Sci. Educ.* 14, 1-12
- Couch BA, Wood WB, **Knight JK**. (2015) The Molecular Biology Capstone Assessment: A Concept Assessment for Upper-Division Molecular Biology Students. *CBE Life Sci. Educ.* 14,1-11.
- **Knight JK**, Wise SB, Rentsch J, Furtak EM (2015). Cues Matter: Learning Assistants Influence Introductory Biology Student Interactions during Clicker-Question Discussions. *CBE Life Sci. Educ.* 14, 1-14.
- **Knight JK**, Wise, SB, Southard KM (2013). Understanding clicker discussions: student reasoning and the impact of instructional cues. *CBE Life Sci. Educ.* 12, 645–654.
- **Knight, JK**, Wood, WB, Smith, MK. (2013). What’s downstream? A set of classroom exercises to help students understand recessive epistasis. *Journal of Microbiology and Biology Education* 14, 197-205.

- Prevost, LB, **Knight, JK**, Smith, MK, Urban-Lurain, M (2013). Student writing reveals their heterogeneous thinking about the origin of genetic variation in populations. In Proceedings of the National Association for Research in Science Teaching (NARST) annual conference. Rio Grande, Puerto Rico.
- Hoskinson, A-M, Cabalero, MD, **Knight JK** (2013) How Can We Improve Problem-solving in Undergraduate Biology? Applying Lessons From 30 Years of Physics Education Research. *CBE Life Sci. Educ.* 12: 153-161.
- Smith, MK and **Knight, JK** (2012). Using the Genetics Concept Assessment to Document Persistent Conceptual Difficulties in Undergraduate Genetics Courses. *Genetics* 191, 21–32.
- Haudeck KC, Kaplan, JJ, **Knight JK**, Long, T, Merrill, J, Munn A, Nehm R, Smith MK, Urban-Lurain M (2011). Harnessing Technology to Improve Formative Assessment of Student Conceptions in STEM: Forging a National Network *CBE Life Sci Educ* 10, 149-155
- Semsar K, **Knight JK**, Birol G, Smith MK (2011). The Colorado Learning Attitudes about Science Survey (CLASS) for use in Biology. *CBE Life Sci. Educ* 10, 268-278.
- Smith MK, Wood, WB, Krauter, K, **Knight JK**. (2011). Combining Peer Discussion with Instructor Explanation Increases Student Learning from In-class Concept Questions. *CBE Life Sci. Educ.* 10, 55-63.
- Shi J, Wood WB, Martin JM, Guild NA, Vincens Q, **Knight JK**. (2010). A Diagnostic Assessment for Introductory Molecular and Cell Biology. *CBE Life Sci. Educ.* 9, 453-461.
- **Knight JK** and Smith MK (2010). Different but equal? How non-majors and majors approach and learn genetics. *CBE Life Sci. Educ.* 9, 34-44.
- Smith MK, Wood WB, Adams WK, Wieman C, **Knight JK**, Guild NA, Su TT (2009). Why peer discussion improves student performance on in-class concept questions. *Science* 323, 122-124.
- Smith, MK, Wood, WB, **Knight, JK** (2008). The Genetics Concept Assessment: A New Concept Inventory for Gauging Student Understanding of Genetics. *CBE Life Sci. Educ.* 7, 422-430.
- **Knight, JK** and Wood, WB (2005). Teaching more by lecturing less. *CBE Life Sci. Educ.* 4, 298–310.
- **Knight, J.K.** and Wood, W.B. (1998). *gad-1* is required for gastrulation initiation in *C. elegans* and encodes a protein with WD repeats. *Dev. Biol.* 198, 253-265.
- Powell-Coffman, JA, **Knight, JK**, Wood, WB (1996). Onset of *C. elegans* gastrulation is blocked by inhibition of embryonic transcription with an RNA polymerase antisense RNA. *Dev. Biol.* 178, 472-483.
- **Knight, JK**, Raymond, PA (1995). Retinal pigmented epithelium does not transdifferentiate in adult goldfish. *J. Neurobiol.* 27, 447-456.
- Raymond, PA, Barthel, LK, Rounsifer, ME, Sullivan, SA, **Knight, JK** (1993). Expression of rod and cone visual pigments in goldfish and zebrafish: a rhodopsin-like gene is expressed in cones. *Neuron* 10, 1161-1174.
- **Knight, JK**, Raymond, PA (1990). Time course of opsin expression in developing rod photoreceptors. *Development* 110, 1115-1120.

Conference Proceedings

- Wood, WB and **Knight, JK** (2004). Teaching large biology classes: active-engagement alternatives to lecturing and evidence that they work. *Molecular Biology of the Cell* 15, S338a.
- **Knight, JK**, (2004) Using the worm, *Caenorhabditis elegans*, in undergraduate genetics and developmental biology laboratories. *in: Tested Studies for Laboratory Teaching, Conference Proceedings of the Association for Biology Laboratory Education (ABLE), Volume 26.*
- **Knight, JK** and Wood, WB (2002). Student discussion of journal articles in a class of >60. *Dev. Biol.* 247, 408.

Invited Review

- **Knight JK**. (2010). Biology Concept Assessment Tools: Design and Use. *Microbiology Australia* 31(1), 5-8.

Books and Book Chapters

- Dirks C, **Knight JK** (2016). Measuring College Learning in Biology. *in Improving Quality in American Higher Education: Learning Outcomes and Assessments for the 21st Century*, Jossey-Bass, San Francisco CA.
- Mari-Beffa, M and **Knight, JK** eds. (2005) Key Experiments in Practical Developmental Biology. Cambridge University Press.

Selection of Invited Talks

2018 December Case Western Reserve University, invited faculty seminar, Neuroscience Dept.
2018 October Cornell University, two invited talks for Center for Teaching Initiative
2018 February UC Santa Cruz, invited talk
2017 October Scientific Teaching Webinar; Yale Center for Teaching and Learning
2017 July ASMCUE Denver; invited plenary: Evidence-based methods to improve student learning
2017 January UC San Diego, Dept. Biology faculty seminar
2017 January UC Irvine SABER West invited workshop and talk
2017 February University of Utah, Dept. Biology faculty seminar
2016 West Virginia University, Dept. Biology, faculty seminar
2016 University of North Texas, Dept. Biology, faculty seminar
2016 University of Maine Center for RISE workshop and invited conference talk
2016 Harvard University Medical School, seminar for Curriculum Fellows Program
2016 Yale University Summer Institute Leaders Meeting
2015 University of Tennessee, faculty seminar
2015 Iowa State, faculty seminar
2015 University of Georgia, Department of Genetics, faculty seminar
2015 University of Minnesota, Department of Biology Teaching and Learning, faculty seminar
2015 University of Northern Colorado, Department of Biology, faculty seminar
2014 Colorado State University, Department of Biology, faculty seminar
2014 University of North Carolina Chapel Hill, Department of Biology, faculty seminar and workshop
2014 Yale University; faculty workshop and keynote speaker
2014 Arizona State University, two workshops on active learning and assessment
2013 Society for the Advancement of Biology Education Research, U. of Minnesota, Keynote Speaker
2013 Wayne State University, Backward design workshop
2013 University of Wyoming Department of Biology, faculty seminar
2013 University of Richmond Department of Biochemistry, faculty seminar
2013 St. Mary's College of Maryland, Biochemistry and Molecular Biology Workshop invited speaker
2013 Colorado State University Department of Biology, Teaching workshop
2013 University of Colorado, Denver, Department of Biology, faculty seminar
2012 Experimental Biology Meeting, San Diego CA, invited speaker
2012 University of Washington Medical School AWARE Retreat: Plenary Speaker and workshop presenter
2012 University of Northern Colorado, Department of Biology, faculty seminar
2012 Introductory Biology Program Conference, Washington DC, invited speaker
2012 University of Maine, Department of Biology, faculty seminar
2012 Southeast Summer Institute on Undergraduate Education in Biology, invited speaker
2011 University of New Mexico Medical School Active Learning Workshop, invited speaker and workshop
2010 Case Western University Department of Biology, faculty seminar

Teaching Activities

Postdoc advisor to:

Michelle Smith 2006-2010; Current position: Associate Professor, Cornell University
Jia Shi 2006-2009; Current position: Instructor, Integrative Physiology, CU.
Sarah Wise 2009-2010; Current position: Department Action Team Coordinator, CU.
Brian Couch 2011-2014; Current position: Assistant Professor, University of Nebraska, Lincoln.
Jeremy Rentsch 2014-2015; Current position: Assistant Professor, Marion University.
Kate Semsar 2014-2016; Current position: Assistant Director Miramontes Arts & Sciences Program, CU.
Jennifer Avena 2015-current

Betsy McIntosh 2017-2018: Current position, Pedagogy Course Coordinator and Instructor, Learning Assistant Program, CU.

Graduate student (Ph.D.) advisor to

Alex Paine 2016-present

Gretchen Wettstein 2017-present

Main Research Advisor to Undergraduate Honors Students

Tassa Ruoff '01, Summa Cum Laude, MCD Biology, University of Colorado

Nicholas Breitnauer '09, Summa Cum Laude, General Honors, University of Colorado

Undergraduate Honors Student Committees: served on 14 since 2003

Undergraduate Research Students supervised: 13 since 2006

Teaching supervised: Learning Assistants in the University of Colorado Learning Assistant: 25 since 2005, in courses MCDB 1030, MCDB 1041, MCDB 2150, and MCDB 4650

Formal Teaching (current)

MCDB 2150 Principles of Genetics Spring semesters (teach 1 section of ~180 students, coordinate both sections (~375-400 students), teaching assistants (9), and learning assistants (6) for course): 2015-present

MCDB 4650 Developmental Biology Fall and Spring semesters 1999-2007; Spring semesters 2007-2013, Fall 2017, Fall 2018 (~75 students per semester)

MCDB 5650 Teaching and Learning once per academic year 2010-2018 (~15 students)

MCDB 5230 Gene expression several lectures F 2018 (MCDB Graduate Student "Core" course)

Previously taught courses:

MCDB 1041 Fundamentals of Human Genetics; Spring semesters 1999-2014 (30-90 students)

MCDB 3650 The Brain, from Molecules to Behavior; Fall semesters 2007-2014 (~45 students)

MCDB 4660 Developmental Biology Lab; Fall and Spring semesters 1999-2007 (4 sections, ~80 students total)

MCDB 4790 Experimental Embryology; Spring semesters 2014, 2015 (~25 students)

CIRTL Network Synchronous Online Instructor: "Research Mentor Training", Fall 2010, with Christine Pfund, University of Wisconsin Delta Program (~10 students)