

Devlin B. Montfort, Ph.D

School of Chemical, Biological and Environmental Engineering
Oregon State University
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TEACHING EXPERIENCE

Process Engineering Laboratory (2014-2017)

- Senior-level laboratory course for chemical, environmental and biological engineers
- Provided copious feedback on more than 3000 pages of student writing per year with a team of 10 instructors and TA's

Fundamentals of Environmental Engineering (2015-2017)

- First course on environmental engineering for ENVE majors in the curriculum

Foundations of Engineering Education (2014-2017)

- Overview of engineering education practices and research for graduate students
- First course on engineering education developed and implemented at Oregon State University

Mechanics of Materials (2012-2013)

- Integrated active learning and online interactions into large classes (>55 students)
- Incorporated original research in engineering education into activities and assessment

Introductory Mathematics for Engineering Applications 2 sections (2011-2012)

- Revised curricula provided to better reflect mathematics learning objectives at WSU
- Averaged 25% increase in math placement scores

Introduction to Surveying (summer 2009)

- Re-designed curricula including lectures, homework assignments and exams to fit condensed summer schedule

Innovation in Design (2007-2008)

- Designed laboratory assignments, grading rubrics, and lectures

EDUCATION

Washington State University

Ph.D, Civil Engineering	2011
Dissertation: <i>Conceptual and Epistemological Undercurrents in Learning as a Process of Change</i>	
Certificate: Nitrogen Systems, Dynamics and Policy	
M.S., Civil Engineering	2007
Thesis: <i>An Investigation of Students' Conceptual Understanding In Related Sophomore To Graduate-Level Engineering And Mechanics Courses</i>	
B.S., Civil Engineering, Minor in Spanish	2006

SELECTED WORK EXPERIENCE

- Assistant Professor:** School of Chemical, Biological, and Environmental Engineering
Oregon State University 2013 – Present
- Assistant Research/Clinical Professor:** Department of Civil and Environmental Engineering
Washington State University 2011 – 2013
- Fellow: NSPIRE Program (NSF IGERT Program) 2010 – 2011
- Completed coursework and contributed to program evaluation through research on learning
- Writing Consultant: Writing Center 2004 – 2008
- Consulted diverse students on academic writing and writing for publication in multiple disciplines
- Owner: Darper Etcho Engineering Support Services Summers, 2004 – 2007
Bellingham, Washington
- Sub-contracted as an EIT for a small, municipally-based consulting firm.
- Intern: Reichhardt & Ebe Consulting Engineers, Inc. Summers, 2001– 2003
Lynden, Washington
- Introduced to the consulting process including drafting, surveying and quantity estimates.

REFEREED JOURNAL ARTICLES AND BOOK CHAPTERS

- 1) Brown, S., K. Beddoes, D. Montfort and A. Baghdanov. (In Press). Engineering students' fluid mechanics misconceptions: A description and theoretical explanation. *International Journal of Engineering Education*.
- 2) Beddoes, K., **D. Montfort** and S. Brown. (2017). Squaring philosophy of engineering with personal epistemologies research. In D.M. Michelfelder, B. Newberry and Z. Zhu (eds), *Philosophy and Engineering: Exploring Boundaries, Expanding Connections*. (pp. 23-41). Springer.
- 3) **Montfort, D.**, G. Herman, S. Brown, R. Streveler, and O. Adesope. (2015). Patterns of student conceptual understanding across engineering content areas. *International Journal of Engineering Education*. 31 (6A), 1587-1604.
- 4) Brown, S., A. Easley, **D. Montfort**, J. Adam, B. Van Wie, O. Adesope, C. Poor, C. Tobin, and A. Flatt. (2014). Effectiveness of an Interactive Learning Environment Utilizing a Physical Model. *ASCE Journal of Professional Issues in Engineering Education and Practice*. 140 (3), Article 3.
- 5) **Montfort, D.**, S. Brown, and D. Shinew. (2014). The Personal Epistemologies of Civil Engineering Faculty, *Journal of Engineering Education*. 103 (3), 388-416.
- 6) Streveler, R., S. Brown, G. Hermann, and **D. Montfort**. (2014) Conceptual Change and Misconceptions in Engineering Education: Curriculum, Measurement, and Theory-Focused Approaches. In A. Johri and B. Olds (eds), *Cambridge Handbook of Engineering Education Research*. (pp. 83-102). Cambridge University Press.
- 7) **Montfort, D.**, S. Brown, and V. Writenouer. (2013). Secondary Students' Conceptual Understanding of Engineering as a Field, *Journal of Pre-college Engineering Education Research*. 3(2), Article 2.
- 8) Davis, S., S. Brown, M. Dixon, R. Borden and **D. Montfort**. (2013) Embedded Knowledge in Transportation Engineering: Comparisons Between Engineers and Instructors, *ASCE Journal of Professional Issues in Engineering Education and Practice*. 139 (1), 51-58.
- 9) **Montfort, D.** and S. Brown. (2013) What is cyberlearning? Practitioners' and Experts' Perspectives. *Journal of Science Education and Technology*. 22 (1), 90-102.
- 10) **Montfort, D.**, S. Brown, and J. Pegg. (2012) The Adoption of a Capstone Assessment Instrument. *Journal of Engineering Education*. 101 (4). 657–678.
- 11) Andrews, B., S. Brown, **Montfort, D.**, and M. Dixon. (2010) Student understanding of sight distance

in geometric design: A beginning line of inquiry to characterize student understanding of transportation engineering. *Transportation Research Record*. 2199: 1-8.

- 12) **Montfort, D.**, S. Brown and D. Pollock. (2009) An investigation of students' conceptual understanding in related sophomore to graduate-level engineering and mechanics courses. *Journal of Engineering Education*. 98 (2).
- 13) Brown, S., **D. Montfort**, and K. Hildreth, (2008). An investigation of student understanding of shear and bending moment diagrams. In W. Aung, J. Mecsi, J. Moscinski, I. Rouse and P. Willmot (Eds.), *Innovations 2008: World Innovations in Engineering Education and Research*. Begell House Publishing: 81-101.

REFEREED CONFERENCE PROCEEDINGS

- 1) Panther*, G., **D. Montfort**, and Z. Pirtle. (2017). How engineers negotiate domain boundaries in a complex, interdisciplinary engineering project. *2017 Annual Conference of the American Society of Engineering Education*. Columbus, OH.
- 2) Panther*, G. and **D. Montfort**. (2017) Exploring how knowledge is enacted within engineering practice. *7th Research in Engineering Education Symposium*. Bogota, Columbia.
- 3) Colcer*, L., Smith, C., and **D. Montfort**. (2017). Problems of our own devising: Individuals' challenges in enacting systemic changes to increase the inclusivity of engineering departments. *2017 Annual Conference of the American Society of Engineering Education*. Columbus, OH.
- 4) Sweeney, J., M. Bothwell, S. Davis, M. Koretsky, **D. Montfort**, and S. Nolen. (2017). Motivating and engaging faculty in cultural and curricular transformation of a multidisciplinary engineering school. *2017 Annual Conference of the American Society of Engineering Education*. Columbus, OH.
- 5) Panther*, G., **D. Montfort**, and S. Brown. (2016). Instructors playing the role of developer and implementer: Impacts on material development. *2016 Annual Conference of the American Society of Engineering Education*. New Orleans, LA.
- 6) Arbogast*, C., **D. Montfort**, and S. Brown. (2016). Applying natural language processing techniques to an assessment of student conceptual understanding. *2016 Annual Conference of the American Society of Engineering Education*. New Orleans, LA.
- 7) **Montfort, D.**, K. Beddoes, and S. Brown. (2015). Engineers and their knowledge: A longitudinal study of practicing engineers' personal epistemologies. *The 6th Research in Engineering Symposium*. Dublin, Ireland.
- 8) Arbogast*, C., **D. Montfort**, and S. Brown. (2015). Examining interruptions in a student's solution generating process for indicators of conceptual knowledge. *2015 Annual Conference of the American Society of Engineering Education*. Seattle, WA.
- 9) Panther*, G., **D. Montfort**, and S. Brown. (2015). Instructor concerns and use of resources in the development of course materials. *2015 Annual Conference of the American Society of Engineering Education*. Seattle, WA.
- 10) Panther*, G., **D. Montfort** and S. Brown. (2015). The role of storytelling in the co-development of mechanics course materials. *Australian Association for Engineering Education Annual Conference*. Torquay, Australia.
- 11) Panther*, G., **D. Montfort** and S. Brown. (2015). Building collaborations through storytelling while revising mechanics of materials curriculum for implementation. *Australian Association for Engineering Education Annual Conference*. Torquay, Australia.
- 12) Beddoes, K., **D. Montfort**, and S. Brown. (2015). Epistemological foundations of global competencies: A new theory to advance research on global competencies. *2015 Annual Conference of the American Society of Engineering Education*. Seattle, WA.
- 13) **Montfort, D.**, S. Brown, C.J. Riley, L. Barroso, D. Pollock, J. Light, and A. Lenz* (2015). Lessons learned from collaborative development of research-based course materials. *2015 Annual Conference of the American Society of Engineering Education*. Seattle, WA.

- 14) Smith, C., A. Bowen, **D. Montfort**, and M. Koretsky. (2014). Identification of Students' Epistemological Frames in Engineering. *2014 Annual Conference of the American Society of Engineering Education*. Indianapolis, IN.
- 15) Beddoes, K., **D. Montfort**, and S. Brown. (2014). Exploring conceptual understanding and personal epistemologies through metaphor. *2014 IEEE Frontiers in Education Conference*. Madrid, Spain.
- 16) Smith, C., D. Gilbuena, **D. Montfort**, and M. Koretsky. (2014). Epistemological frames of graduate teaching assistants and instructors in studio-based engineering classes. *2014 IEEE Frontiers in Education Conference*. Madrid, Spain.
- 17) **Montfort, D.**, K. Beddoes, and S. Brown. (2014). Broadening the research landscape to include personal epistemology. *2014 Forum on Philosophy, Engineering and Technology*. Blacksburg, VA.
- 18) Frye, N., **D. Montfort**, and S. Brown. (2013). Personal epistemology and sophomore engineering students. *2013 Annual Conference of the American Society of Engineering Education*. Atlanta, GA.
- 19) **Montfort, D.**, G. Herman, R. Streveler, S. Brown, and H. Matusovich. (2013). Novice-led Paired Thematic Analysis: A methodological approach to conceptual change in engineering. *2013 Annual Conference of the American Society of Engineering Education*. Atlanta, GA.
- 20) Easley, A., S. Brown, J. Adam, **D. Montfort**, and B. VanWie. (2012). Open Channel Flow Misconceptions and Ontological Categories. *IEEE Frontiers in Education Annual Conference*. Seattle, WA.
- 21) Herman, G., R. Streveler, **D. Montfort**, and S. Brown. (2012). Work in Progress: Do students need to learn to speak "Engineering-ese?" Conceptual change as language acquisition in Engineering. *IEEE Frontiers in Education Annual Conference*. Seattle, WA.
- 22) **Montfort, D.**, G. Herman, R. Streveler, and S. Brown. (2012). Assessing the application of three theories of conceptual change to interdisciplinary data sets. *IEEE Frontiers in Education Annual Conference*. Seattle, WA.
- 23) **Montfort, D.**, S. Brown, and N. Frye. (2012) Work in Progress: Theoretical Approach to Characterizing Changes in Students' and Engineers' Conceptual Understanding and Personal Epistemologies. *IEEE Frontiers in Education Annual Conference*. Seattle, WA.
- 24) Frye, N., **D. Montfort**, S. Brown, and O. Adesope. (2012). I'm absolutely certain that's probably true: Exploring epistemologies of sophomore engineering students. *IEEE Frontiers in Education Annual Conference*. Seattle, WA.
- 25) **Montfort, D.**, and S. Brown. (2011). Building fundamental engineering knowledge: Identification and classification of engineering students' preconceptions in mechanics of materials. *2011 Annual Conference of the American Educational Research Association*. New Orleans, LA.
- 26) Brown, S., D. Lewis, **D. Montfort**, and R.L. Borden. (2011). The importance of context in students' understanding of normal and shear stress in beams. *2011 Annual Conference of the American Society of Engineering Education*. Vancouver, B.C.
- 27) Frye, N., S. Brown, P. Smith and **D. Montfort** (2011). Understanding faculty and practitioner involvement in a capstone interdisciplinary design experience. *2011 Annual Conference of the American Society of Engineering Education*. Vancouver, B.C.
- 28) **Montfort, D.**, and S. Brown. (2010). Secondary students' perceptions of engineers and engineering: A case study approach. *2010 Annual Conference of the American Society of Engineering Education*. Louisville, KY.
- 29) **Montfort, D.** (2010). Epistemological and conceptual changes in engineering. *Poster presented at 2010 Annual Conference of the American Society of Engineering Education*. Louisville, KY.
- 30) **Montfort, D.**, and S. Brown. (2010). Conceptual change and understanding in engineering education. *2010 American Society for Engineering Education Zone IV Conference*. Reno, NV.
- 31) **Montfort, D.** (2010). Interdisciplinary learning as a cognitive phenomenon: Nitrogen in the ecological and political environment. *Poster presented at the 2010 NSF-IGERT Awardees Conference*. Washington, D.C.
- 32) **Montfort, D.**, Brown, S. and J. M. Pegg. (2009). An investigation of the adoption of an assessment instrument for capstone design courses. *2009 ASEE/IEEE Frontiers in Education Conference*. San Antonio, TX.

- 33) Brown, S., **D. Montfort**, and K. Findley. (2007). Student Understanding of States of Stress in Mechanics of Materials, Proceedings of 2007 Annual Conference of the American Society of Engineering Education. Honolulu, HI.
- 34) Brown, S., **D. Montfort**. (2007). Development, Implementation, and Assessment of a Bending Stress Tutorial, Proceedings of 2007 Frontiers in Education Conference. Milwaukee, WI.
- 35) Brown, S., **D. Montfort**. (2007). Using Interviews to Identify Student Misconceptions in Dynamics, Proceedings of 2007 Frontiers in Education Conference. Milwaukee, WI.

* - Graduate or undergraduate student funded and mentored by Montfort

WORKSHOPS

- 1) Ranking Tasks Exercises for Mechanics of Materials, ASEE Pacific Northwest Meeting, Spring 2010
- 2) Student Understanding in Mechanics of Materials, Dissemination and Project Report of NSF-Funded research, Summer 2011
- 3) Collaboratively Developing Research-Based Curricular Materials, Summer 2014-2015

RESEARCH GRANTS

PI:

Applied, Related, Knowledge: Defining Engineers' and Students' Domains of Knowing. National Science Foundation Research in Engineering Education.
September 2014 to September 2017. \$293,592

CAREER: Personal Epistemology in Engineering Education. National Science Foundation Research in Engineering Education.
April 2016 to April 2021. \$509,336

RAPID: Ethnographic field study of engineering knowledge systems: Developing a social-process-centric situated model. National Science Foundation Division of Undergraduate Education.
August 2016 to August 2018. \$103,224

Co-PI:

Collaboratively Developing Research-Based Curricular Materials to Improve Conceptual Understanding in Engineering Education. National Science Foundation Transforming Undergraduate Education in Science, Technology, Engineering, and Mathematics (TUES) program.
September 2012 to September 2015. \$599,798

The Oregon State University STEM Leaders Program. National Science Foundation Improving Undergraduate STEM Education (IUSE) program.
August 2014 to September 2019. \$1,500,021

Shifting Departmental Culture to Re-Situate Learning and Instruction. National Science Foundation Professional Formation of Engineers Revolutionizing Engineering Departments (IUSE:PFE:RED program).
August 2015 to September 2020. \$2,000,000

Post-Doctoral Researcher:

Digital Dissemination Platform of Transportation Engineering Educational Materials Founded in Adoption Research. Pacific Northwest Transportation Consortium.
May 2012 to May 2013. \$200,000

Collaborative Research: Building Theories That Inform Practice: Exploring Engineering Epistemologies Through Cross-Disciplinary Data Analysis. National Science Foundation Engineering and Education Centers Division.

August 2011 to August 2014. \$276,369.

What is Engineering Knowledge: A Longitudinal Study of Conceptual Change and Epistemology in Engineering Students and Practitioners. National Science Foundation Engineering and Education Centers Division.

August 2010 to August 2013. \$398,353

EDITORIAL ACTIVITIES

Corresponding Editor for ASCE Journal of Professional Issues in Engineering Education, 2013-present

Peer Reviewer for International Journal of Engineering Education, 2013, 2014

Peer Reviewer for Journal of Engineering Education, 2012-present

Peer Reviewer for ASCE Journal of Professional Issues in Engineering Education, 2012

Peer Reviewer for Cambridge Handbook of Engineering Education, 2011

Peer Reviewer for American Society for Engineering Education Annual Conference, 2010-present

Peer Reviewer for IEE Frontiers in Education Annual Conference, 2010-present

PROFESSIONAL SOCIETY MEMBERSHIPS

American Society of Civil Engineers, 2015-present

American Society for Engineering Education, 2008-present

American Educational Research Association, 2010-present

International Network for Engineering Studies, 2014-present

UNIVERSITY SERVICE

Co-Chair ENVE Graduate Curriculum and Assessment Committee, 2016-2017

ABET and Accreditation Committee, 2016-2017

CBEE Curriculum Committee, 2014-Present

CoE Engineering Liason for Writing-Intensive-Curriculum 2014-2015

ENVE Program Committee. 2015-Present

CBEE Graduate Committee, 2014-2015

CBEE Space Committee, 2014-2015

STUDENT ADVISING

Graduate Student – Major Professor - Current and Graduated

1. **Si Chen** MEng Environmental Engineering 2017
2. **Jie Jian** MEng Environmental Engineering 2017
3. **Andrea Haverkamp** PhD. Environmental Engineering 2016 to present
co-advised with Michelle Bothwell
4. **Grace Panther** PhD. Environmental Engineering 2015 to present
5. **Bolun Pan** MEng Environmental Engineering 2016
6. **Grace Panther** MS Environmental Engineering 2015
7. **Christian “Kit” Arbogast**, MS Mechanical Engineering 2015
co-advised with Bryony DuPont
8. **Brent Olson** MS Civil Engineering (WSU) 2014

Graduate Student – Committee Member – Current and Graduated

Christina Smith	PhD.	Chemical Engineering	2013 to present
Jason Pacoe	MS	Civil Engineering	2016
Erick Nefcy	PhD	Chemical Engineering	2016
Jessie Keeler	MS	Chemical Engineering	2016
Floraliza Bornasal	PhD	Civil Engineering	2015
Amber Berger	MS	Civil Engineering	2015
Quincy Lee	MS	Civil Engineering	2013

Graduate Student – Graduate Council Representative

Lauren Bomeisl	MS	Water Resources Engineering	2017
Dakota Clement	MFA	Creative Writing	2017
Victoria Drexel	MFA	Creative Writing	2017
Linnea Nelson	MFA	Creative Writing	2017
Rita Feinstein	MFA	Creative Writing	2016
Kelsey Harpham	MS	Water Resources Engineering	2016
Austin Anderson	MFA	Creative Writing	2015
Dennis Sweeney	MFA	Creative Writing	2015
Virginia Murphey	MS.	Environmental Science	2014
Daniel Simpson	MS	Civil Engineering	2014
Spencer Ambauen	MS	Civil Engineering	2014
Erica Kemp	MS	Water Resources Engineering	2015
Rachael Fischer	MS	Civil Engineering	2015

STUDENT EVALUATIONS OF TEACHING

Course Number	Course Title	Term (University)	Student Enrollment	Average Student Evaluation*	Department Average
ENVE 322	Fundamentals of Environmental Engineering	Winter 2017	42	4.8 / 6.0	
		Winter 2016	43	4.5 / 6.0	
		Winter 2015	36	4.8 / 6.0	4.6 / 6.0
CBEE 414	Process Engineering Laboratory	Fall 2016	73	4.3 / 6.0	
		Fall 2015			
		Fall 2014	36	4.6 / 6.0	4.6 / 6.0
ENGR 555	Foundations of Engineering Education Research and Practice	Spring 2017	3		
		Spring 2016	3		
		Spring 2015			
		Spring 2014	12	5.6 / 6.0	4.6 / 6.0
CE 215	Mechanics of Materials	Spring 2013 (WSU)	121	4.7 / 5.0	NA
CE 215	Mechanics of Materials	Fall 2012 (WSU)	59	4.4 / 5.0	NA
ENGR 107	Introductory Mathematics for Engineering Applications	Summer 2011 (WSU)	19	4.6 / 5.0	NA
CE 302	Introduction to	Summer 2009	34	4.6 / 5.0	NA

	Surveying	(WSU)			
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* Averaged score from questions 1 and 2 from OSU eSET

HONORS AND AWARDS

Outstanding Reviewer – ASCE Journal of Professional Issues in Engineering Education and Practice, 2012

Apprentice Faculty Grant – ERM Division of American Society for Engineering Education, 2010

ASEE Best Paper – Pacific Northwest (Zone IV), 2010

Honorable Mention, Benjamin Dasher Outstanding Paper Award, 2007 FIE National Conference