

BRETT TALLMAN, PHD, PE

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EDUCATION AND LICENSE

Doctorate of Philosophy, Engineering with Industrial Engineering option Focus on engineering leadership identity development. Montana State University (MSU). Bozeman, MT.	2018 - 2021
Masters of Arts, Education, Curriculum and Instruction Focus on active learning in quantum mechanics. Montana State University. Bozeman, MT.	2016 - 2018
Licensed Professional Engineer, Montana Montana Board of Professional Engineers and Professional Land Surveyors. ID #18405.	2011 - Present
Masters of Arts, Theology (abd) Cincinnati Bible Seminary. Cincinnati, OH.	1999 - 2000
Bachelor of Science, Mechanical Engineering Focus on mechanical design. Cornell University. Ithaca, NY.	1991 - 1995

ACADEMIC APPOINTMENTS AND INDUSTRY POSITIONS

Instructor, Industrial Engineering, DOE Montana State University. Bozeman, MT.	2021
Graduate Research Assistant, Engineering Leadership. Montana State University. Bozeman, MT.	2017 - 2020
Graduate Teaching Assistant, Quantum Mechanics. Montana State University. Bozeman, MT.	2017
Lead Engineer, Product design, biomed consultant HomeGrown Engineering. Bozeman, MT	est. 2005
Design Engineer, Product design Autopilot. Bozeman, MT.	2008 - 2011
Math Teacher, Advisor, and Coach. Vermont Academy. Saxtons River, VT	2002 - 2005
Minister. Kent Vineyard. Kent, OH	2001 - 2002
Engineering Specialist, North American quality Toyota Motor Manufacturing. Erlanger, KY	1995 - 1998
Undergraduate Researcher, Biomechanics research Cornell University. Ithaca, NY	1994 - 1995

FIELDS OF INTEREST

1. Engineering leadership development
2. Statistics
3. Education foundations
4. STEM education
5. Engineering design

PROFESSIONAL SOCIETIES AND SERVICE

American Society for Engineering Education (ASEE)	2018 - present
Secretary and Webmaster (elected), ASEE LEAD Division	2021 - 2022
European Society for Engineering Education (SEFI)	2021 - present
American Society for Engineering Management (ASEM)	2018 - 2019
American Educational Research Association (AERA)	2018
Alpha Pi Mu Honor Society (APM)	2020
Northstar Environmental Board, Engineering Advisor	2015 - present

ACADEMIC AWARDS AND GRANTS

Awards	Date
Best Paper in the Category. AAEE Conference	2019
Dr. Gregory Schraw Graduate Student Fellowship Award. NRMERA Conference	2018

Grants	Amount	Date
Professional Advancement Grant. MSU Graduate School. ASEM Conference	\$500	2019
Community Building Mini-Grant. MSU Graduate School. Professional development.	\$500	2019
Education Department grant, MSU. ASEE Conference.	\$400	2018
EHHD College conference grant. MSU. AERA Conference.	\$400	2018
Education Department. MSU. NRMERA Conference.	\$400	2018

PUBLICATIONS

Under Review

1. **B. Tallman**, Schell, W.J., B.E. Hughes, D.K. Sobek, R. Carson (2022, Abstract accepted). Development of an Identity-based Engineering Leadership Intervention. 2022 American Society of Engineering Education (ASEE) Annual Conference and Exhibition, Minneapolis, MN.

15 additional works are presently in-progress for future submission to publication.

Peer-reviewed Journals

1. Hughes, B.E., W.J. Schell, **B. Tallman**, T. Sybesma, M. Kwapisz, E. Annand, S. Ranch, C. Bozic, C.C. Krejci, and D. A. Kotys-Schwartz. 2021. Entering the Community of Practice: Changes in Engineering Students' Engineering Identities and Perceptions of the Field. *European Journal of Engineering Education*, 46 (6), 468-486.
2. Schell, W.J., B.E. Hughes, **B. Tallman**, M. Kwapisz, T. Sybesma, E. Annand, C. Bozic, C.C. Krejci, and D. A. Kotys-Schwartz. 2021. Understanding the Joint Development of Engineering and Leadership Identities. *Engineering Management Journal*, DOI: 10.1080/10429247.2021.1952021.
3. Handley, M., J. Plumblee, **B. Tallman**, B. Novoselich, S. Sullivan, T. Kennedy, L. Houghtalen, M. Tan. 2021. Engineering Leadership Across Disciplines: A Systematic Literature Review. *International Journal of Engineering Education*, 37 (2), 311-324.

Refereed Conference Proceedings with Presentation

1. **Tallman, B.** and W. Zorman. 2021. How do Human Interaction Labs contribute to engineering leadership development? Paper presented at the Proceedings of the American Society of Engineering Education (ASEE) Annual Conference and Exhibition, Long Beach, CA.
2. **Tallman, B.,** T. Sybesma, W. Schell, B. Hughes, M. Kwapisz, and S. Ranch. 2020. Developing Students' Engineering Leadership Identity: Development and Results of a Pilot Effort with First Year Students. Paper presented at the Proceedings of the American Society of Engineering Education (ASEE) Annual Conference and Exhibition, Online.
3. Hughes, B.E., W.J. Schell, **B. Tallman,** and M. Kwapisz. (2020). Fostering Engineering Leadership Identity in the Classroom. Proceedings of the American Australasian Engineering Education (AAEE) Annual Conference, Sydney (online), Australia.
4. Schell, W.J. , B.E. Hughes, **B. Tallman,** T. Sybesma, M. Kwapisz, E. Annand, S. Ranch. 2019. How Do Students View Leadership Identity in Engineering. Proceedings of the American Australasian Engineering Education (AAEE) 2019 Conference Brisbane, Australia. *Best paper in Category, Motivation and Engagement of Students, Academics and Industry*
5. Kwapisz, M.B., T.A. Sybesma, E. Annand, S. Ranch, R. Beigel, W.J. Schell, B.E. Hughes, and **B. Tallman.** 2019. The Effect of Engineering Leadership Identity Research on the Identities of Student Researchers. Proceedings of the American Society for Engineering Management (ASEM) International Annual Conference, Philadelphia, PA.
6. **B. Tallman,** W.J. Schell, T. Sybesma, M. Kwapisz, B.E. Hughes, S. Ranch, C. Bozic, and D. Kotys-Schwartz. 2019. How Do Engineering Undergraduates Define Engineering Identity? Proceedings of the American Society for Engineering Management (ASEM) International Annual Conference, Philadelphia, PA.
7. Hughes, B.E., W.J. Schell, and **B. Tallman.** 2019. How Legitimate Peripheral Participation in Engineering during College affects Professional Identity. American Educational Research Association (AERA) Annual Meeting, Toronto, Ontario, Canada.
8. Hughes, B.E., W.J. Schell, E. Annand, R. Beigel, M. Kwapisz, and **B. Tallman.** 2019. Do I Think I'm an Engineer? Understanding the Impact of Engineering Identity on Retention. Proceedings of the American Society for Engineering Education (ASEE) Annual Conference and Exhibition, Tampa, FL.
9. Beigel, M., Annand, E., M. Kwapisz, Schell, W.J., B.E. Hughes, and **B. Tallman.** 2019. Engineering Leadership Identity: A Qualitative Approach to Understand the Intersection of Engineering and Leadership Identities. Proceedings of the American Society of Engineering Education (ASEE) Annual Conference and Exhibition, Tampa, FL.
10. Hughes, B.E., W.J. Schell, **B. Tallman,** E. Annand, R. Beigel, and M. Kwapisz. 2019. Exploring the Relationship Between Students' Engineering Identity and Leadership. Proceedings of the American Society of Engineering Education (ASEE) Annual Conference and Exhibition, Tampa, FL.
11. Hughes, B.E., Schell, W.J., and **B. Tallman.** 2018. Understanding Engineering Identity in Undergraduate Students. Proceedings of the American Society for Engineering Management (ASEM) International Annual Conference, Coeur d'Alene, ID.
12. Schell, W.J., B.E. Hughes, and **B. Tallman.** 2018. Development of Leadership Self-Efficacy: Comparing Engineers, Other STEM, and Non-STEM Majors. Frontiers in Education (FIE) Conference, Mountain View, CA.
13. Schell, W.J., B.E. Hughes, and **B. Tallman.** 2018. Understanding the Perceived Impact of Engineers' Leadership Experiences in College. Proceedings of the American Society of Engineering Education (ASEE) Annual Conference and Exhibition, Salt Lake City, UT. *Division best paper finalist.*
14. Schell, W.J., B.E. Hughes, and **B. Tallman.** 2018. The Formation of Undergraduate Engineers as Engineering Leaders. Proceedings of the American Society of Engineering Education (ASEE) Annual Conference and Exhibition, Salt Lake City, UT

15. Schell, W.J., B.E. Hughes, and **B. Tallman**. 2018. Exploring the Conflict Between an Engineering Identity and Leadership. Proceedings of the Canadian Engineering Education Association (CEEA) Annual Conference, Vancouver, BC, Canada.
16. **B. Tallman**. 2017. Active Learning in Quantum Physics: A Qualitative Analysis. Northern Rocky Mountain Educational Research Association (NRMERA) Conference Proceedings, Boulder, CO.

Conference Presentations or Posters with Refereed Abstracts

1. Schell, W.J. , B.E. Hughes, **B. Tallman**. 2020. Exploring the Discovery and Development of Undergraduate Engineering Leadership Identity. Proceedings of the American Society for Engineering Management (ASEM) International Annual Conference, Online. Online.
2. Hughes, B.E., W.J. Schell, and **B. Tallman**. 2018. Developing Engineering Leadership Identity within a Community of Practice: A Theoretical Approach. American Educational Research Association (AERA) Annual Meeting, New York, NY.
3. Schell, W.J., B.E. Hughes, and **B. Tallman**. 2017. The Formation of Undergraduate Engineers as Engineering Leaders. National Science Foundation Engineering Education and Centers Grantees Conference, Washington, DC.

Poster Presentations

1. **B. Tallman**. 2018. An Exploration of Student Response to an Active Learning Environment in an Upper-level Quantum Physics Course. Department of Education Graduate Research Symposium, Bozeman, MT.
2. Hughes, B.E., W.J. Schell, and **B. Tallman**. 2018. Developing Engineering Leadership Identity within a Community of Practice: A Theoretical Approach. Department of Education Graduate Research Symposium, Bozeman, MT.
3. **B. Tallman**. 2017. Active Learning in Quantum Physics: A Qualitative Analysis. Department of Education Graduate Research Symposium, Bozeman, MT

Thesis and Dissertation

1. **B. Tallman**. April 2018. An Exploration of Student Response to an Active Learning Environment in an Upper-level Quantum Physics Course. Advisor, Associate Professor Nicholas Lux. Department of Education, Curriculum and Instruction. Montana State University. Bozeman, MT.
2. **B. Tallman**. December 2021. Engineering Leader Identity Development Through Reflexive Instruction. Advisor, Associate Professor William Schell; Co-Chair, Associate Professor Bryce Hughes. College of Engineering, Industrial Engineering. Montana State University. Bozeman, MT.

Publication Reviews

Reviewed seven submissions for journals and national conferences. 2018 - present.

TEACHING-RELATED ACTIVITIES

Date	Description
2021	Taught upper-division and graduate courses, design of experiments. Integrated group work, mastery approaches, and formative assessments in instructional activities.
2017 - 2018	Quantum mechanics course transformation, coordinated with W. Babbitt at Montana State University. Included pre-lecture video development, implementation of simulations, lean homework feedback, active learning exercises, lesson plans, and instructor training. Lesson material used by subsequent instructors.
2017	Graduate Teaching Assistant. Upper-level quantum mechanics for physics students, 12 students.
2017	Masters Research. Upper-level quantum mechanics for physics students. Developed and implemented active-learning resources for WKB approximation lessons.
2013 - 2016	YouTube channel with engineering statics and mechanics of materials videos series, with 100s of thousands of views and thousands of subscribers.
2014	Built Educadia.org website, to organize and integrate content resources (simulations, pre-lecture videos, text) for Engineering Dynamics and Statics.
2013	Engineering Dynamics video development and implementation in engineering dynamics classes, coordinated with A. Ruina at Cornell University
2002 - 2005	Taught Algebra 1, Algebra 2, and Trigonometry. Total of 30 semester-classes.

INDUSTRY EXPERIENCE

Lead Engineer. HomeGrown Engineering. homegrownengineering.com. Bozeman, MT. est. 2005

Process design:

- Designed and built a multi-million dollar, fully operational, FDA-regulated, 12-zone, Class 100 cleanroom suite with WFI-grade water and high purity compressed air systems. Coordinated with over 30 vendors, compliant with FDA regulations.
- Designed and implemented turnkey manufacturing setup for machining cortical bone allografts for international biologics customer.

Select projects:

- Designed new lumbar allograft by working with lead surgeon, developed and tested prototypes implemented machining setup at client, with all needed documentation. Full turnkey solution.
- Utilized various manufacturing processes during prototyping, including sheet metal, mill, lathe, laser cutting, 3D printing, surface finishing, EDM and plastic and die-cast molding.
- Developed and manufactured food property measurement device for national franchise to standardize product quality, for use at franchises.
- Drafting and design of rocky mountain switch facilities and cell tower locations.
- Draft, design, and build of multiple residences.

Design Engineer. Autopilot. Bozeman, MT. 2008 - 2011

- Led and executed the design and manufacture of 150 custom surgical tools, with up to 10 manufacturing steps for each one. Each step required detailed knowledge of the manufacturing process, design constraints, end-user requirements, and customer needs.
- Developed Class 1 surgical tool design, manufacturing, and quality program. This program included FDA compliance, quality tracking, and component tracking.
- Utilized various manufacturing processes during prototyping, including sheet metal, mill, lathe, laser cutting, 3D printing, surface finishing, EDM and plastic and die-cast molding.
- Supported efforts to standardize work and implement best-practices in a prototyping machine shop.

- Worked with clients to develop, market, and manufacture new products– from inventors to well-known international clients
- Wrote white paper exploring Zamak microscopic properties and their influence on machining and prototyping tests.

Math Teacher and Coach. 2002 - 2005

- Taught 4 - 6 classes each semester. Algebra I, Algebra II, and Pre-calculus. Taught a total of 30 semester-courses.
- Created, developed, and coached a varsity mountain biking program, including a mountain bike skills park and cross-country trail. The program has continued growing and recently hosted the region's championships.
- Served as dorm parents for boys and girls at a boarding school.
- Invested heavily in student development, through mentorship, dorm activities, extra-curricular events, and scholarly programs.
- Coached snowboarding and region champion tennis team.
- Mentored under seasoned teacher to cultivate effective pedagogical practices.

Engineering Specialist. Toyota Motor Manufacturing. Erlanger, KY. 1995 - 1998

- Designed and implemented quality systems to promote Toyota Lean Manufacturing Principles with suppliers.
- Served as lead quality engineer for North American durability and customer-related concerns for Avalon and Sienna launch.
- Conducted internal presentations of Toyota principles related to quality improvement and lean manufacturing.

Updated 1-10-2022