
Geoffrey L. Herman

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Qualifications

Faculty Positions

- Teaching Assistant Professor in the Department of Computer Science Aug. 2016 – present
- Research Assistant Professor in the Department of Curriculum and Instruction Oct. 2014 – present
- Visiting Assistant Professor with the Illinois Foundry for Innovation in Engineering Education, University of Illinois at Urbana-Champaign. Aug. 2012 – Aug. 2016

Research

- Postdoctoral Researcher in the School of Engineering Education, Purdue University. Aug. 2011 – July 2012
- Postdoctoral Researcher with the Illinois Foundry for Innovation in Engineering Education, University of Illinois at Urbana-Champaign. May 2011 – July 2012

Consulting

- Engineering Education Consultant with Quality Evaluation Designs. Oct. 2011 – Dec. 2012

Other Teaching Experience and Teacher Training

- Course Instructor, Department of Electrical and Computer Engineering University of Illinois at Urbana-Champaign SU 2008, SU 2010
Aug. 2012 – Dec. 2014
- Affiliate with the Center for Teaching Excellence Dec. 2009 – May 2011

Education

University of Illinois at Urbana-Champaign

- PhD in Electrical and Computer Engineering May 2011
Dissertation title: The Development of a Digital Logic Concept Inventory
Dissertation advisers: Michael C. Loui and Craig Zilles
- MS in Electrical and Computer Engineering Dec. 2007
- BS in Electrical Engineering May 2005

Research Interests

Closing the research-to-practice gap in education, sustainable education innovation at scale, sparking and sustaining education innovation, conceptual change and misconceptions, and assessing student learning.

Research Fellowships and Awards

- IEEE Transactions in Education, Finalist for Best Paper of the Year 2012
- ASEE Educational Research & Methods Division Apprentice Faculty Grant 2011
- IEEE Signal Processing Education Workshop 2011 Best Student Paper Award 2011
- Mavis Future Faculty program fellow: co-founded program, mentored first year fellows. 2010-2011
- E.A. Reid Fellowship for students pursuing an academic career in engineering. 2009
- Mavis Memorial Fund Scholarship for students planning to become engineering teachers. 2008

Students Advised

Prior Doctoral Students

- K. F. Trenshaw, PhD 2014, Department of Chemical and Biological Engineering, Dissertation Title: Improving motivation and engagement in core engineering courses with student teams.

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- Brian Faulkner, PhD 2018, Department of Electrical and Computer Engineering, Dissertation Topic: Studying the implementation of an integrated engineering mathematics curriculum.
 - Nicole Johnson-Glauch, PhD 2018, Department of Materials Science and Engineering, Dissertation Topic: Studying students conceptual understanding of the mechanical properties of materials in the context of computation.

Current Masters Students

- Spencer Offenberger, M.S. 2019 expected, Department of Electrical and Computer Engineering
- Sofia Myers, M.S. 2020 expected, Department of Computer Science
- Sushmita Azad, M.S. 2020 expected, Department of Computer Science
- Aabhas Chauhan, M.S. 2020 expected, Department of Computer Science

Prior Undergraduate Students

- Joseph Handzik, B.S. 2011, Department of Electrical and Computer Engineering
- Pallav Pathak, B.S. 2012, Department of Electrical and Computer Engineering

Teaching Interests

First- and second-year computer science and engineering courses, digital logic design, computer organization, introductory programming, analog signal processing, digital signal processing, music/speech signal processing, cognition and science/engineering learning, educational research methodologies, assessment.

Teaching Experience

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| Learning and Computer Science | Spring 2018 |
| <ul style="list-style-type: none"> • Developed a project-based course engaging students in theories about how people learn and the implications those theories have on how we teach computer science. | |
| Online Learning Systems | Fall 2017 |
| <ul style="list-style-type: none"> • Developed a project-based course to teach students about how to use online assessments to improve student learning and to develop online learning platforms. | |
| Computer Architecture | Fall 2016-2018 |
| <ul style="list-style-type: none"> • Organized content around the core concepts of state, data, control, and indirection • Created a suite of video microlectures to support flipping the classroom | |
| Survey of Engineering Education Research | Spring 2015 |
| <ul style="list-style-type: none"> • Developed a graduate-level course to provide an overview of engineering education research to both engineering and education students. | |
| Introduction to Computer Engineering | Summer 2008, Fall 2012,
Spring 2013, Fall 2013,
Spring 2014 |
| <ul style="list-style-type: none"> • Developed video lectures and flipped lectures with the use of classroom response systems. • Designed a new Freshman-level computer engineering course that integrates instruction of hardware and software in computing contexts. • Designed laboratory assignments and collaborative, context-rich discussion section exercises. • Designed assessment procedures for the effectiveness of the new course. • Trained teaching assistants and undergraduate peer mentors. | |
| Digital Signal Processing | Summer 2010 |
| <ul style="list-style-type: none"> • Piloted a new blended learning environment based using online lectures for the course. • Designed Matlab programming exercises | |

Teaching Awards

- Olesen Award for Excellence in Undergraduate Teaching for the Department of Electrical and Computer Engineering 2007
- List of Teachers Ranked Excellent by their Students 4 semesters

Publications

Book chapters

Streveler, R., Brown, S., Herman, G. L., & Montfort, D. (2014). Chapter 5: Conceptual change and misconceptions in engineering education: Curriculum, measurement, and theory-focused approaches, *Cambridge Handbook of Engineering Education Research*. Eds. A. Johri and B. Olds. Cambridge University Press, 83-102. ISBN: 9781107014107

Rosu, L., Barrett, B., Wilcox, B., Herman, G., Price, R. & Destefano, L. (2014). Engineering Professors who are Re-engineering Their Courses: the iFoundry perspective. In Burton, A. & Winkelmes, M.A. (Eds) Talking about Teaching on the Prairie. University of Illinois Press, Champaign, IL, USA. ISBN-13: 978-0252080234

Peer-reviewed journal articles

Cross, K. J., Mamaril, N., Johnson-Glauch, N., & Herman, G. L. (in submission). Building cultures of collaboration that promote instructional change. *Journal of Higher Education*.

Faulkner, B., Johnson-Glauch, N., Choi, D., & Herman, G. L. (accepted with revisions). Where does the calculus go in engineering coursework? *Journal of Engineering Education*.

Johnson-Glauch, N. & Herman, G. L. (accepted with revisions). Cross-disciplinary analysis of how visual representations influence engineering students' conceptual understanding, *Journal of Engineering Education*.

Tomkin, J. H., Beilstein, S. O., Morphew, J. W., Herman, G. L. (in press). Evidence that Communities of Practice are Associated With Active Learning in Large STEM Lectures, *International Journal of STEM Education*.

Ma, S., Herman, G. L., West, M., Tomkin, J., & Mestre, J. (in press). Studying STEM faculty communities of practice through social network analysis, *Journal of Higher Education*

Faulkner, B., Earl, K., & Herman G. L. (in press). Mathematical maturity for engineering students, *International Journal of Research in Undergraduate Mathematics Education*.

Johnson-Glauch, N. & Herman, G. L. (2019). Engineering representations guide student problem solving in Statics, *Journal of Engineering Education*. April 2019.

Mestre, J.P., Herman, G.L., Tomkin, J.H., & West, M. (2019). Keep your friends close and your colleagues nearby: The hidden ties that improve STEM education. *Change: The Magazine of Higher Learning*, 51 (#1), 42-49.

Ma, S., Herman, G. L., West, M., Tomkin, J., & Mestre, J. (2018). Spreading teaching innovations in a social network: The bridging role of mentors, *Journal of STEM Education Research*, 1(1-2), 60-84. DOI: <https://doi.org/10.1007/s41979-018-0002-6>

Tomkin, J., West, M., Herman. & G. L. (2018). An improved grade point average, with applications to CS undergraduate education analytics, *ACM Transactions on Computing Education*, 18(4), Article 17, 16 pages. DOI: <https://doi.org/10.1145/3157086>

Herman, G. L., Green, J. C., Hahn, L., Mestre, J., Tomkin, J., & West, M. (2018). Implementing evidence-based instructional practices across STEM departments at a large research university, *Journal of College Science Teaching*, 47(6), 32-38.

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- Thompson, J., Herman, G. L., Scheponik, T., Golaszewski, E., Sherman, A. T., DeLatte, D., Phatak, D., Patsourakos, K., & Oliva, L. (2018). Student misconceptions about cybersecurity concepts: Analysis of think-aloud interviews, *Journal of Cybersecurity Education, Research, and Practice*, 2018(1), Article 5. <https://digitalcommons.kennesaw.edu/jcerp/vol2018/iss1/5>
- Mestre, J. P., Cheville, A., & Herman, G. L. (2018). Promoting DBER-Cognitive Psychology Collaborations in STEM Education. *Journal of Engineering Education*, 107(1), 1-6. DOI: [10.1002/jee.20188](https://doi.org/10.1002/jee.20188)
- Parekh, G., DeLatte, D., Herman, G. L., Oliva, L., Scheponik, T., & Sherman, A. T. (2018). Identifying core concepts of cybersecurity: Results of two Delphi processes. *IEEE Transactions on Education*, 61(1), 11-20. DOI: [10.1109/TE.2017.2715174](https://doi.org/10.1109/TE.2017.2715174)
- Choi, D. S., Earl, K., Cross, K., & Herman, G. L. (2018). The challenge of fidelity of outcomes: Insights from an effectiveness study of a low-cost, Intrinsic Motivation Course Conversion. *International Journal of Engineering Education*, 34(1), 141-154.
- Sherman, A. T., DeLatte, D., Herman, G. L., Neary, M., Oliva, L., Dhananjay, P., Scheponik, T., & Thompson, J. (2018). Cybersecurity: Exploring Core Concepts through Six Scenarios, *Cryptologia*, 42(4), 337-377. DOI: [10.1080/01611194.2017.1362063](https://doi.org/10.1080/01611194.2017.1362063)
- Herman, G. L., Goldberg, D. E., Trenshaw, K. F., Somerville, M., & Stolk, J. (2017). The intrinsic-motivation course design method. *International Journal of Engineering Education*, 33(2A), 558-574.
- Herman, G. L. & Loewenstein, J. (2017). Evidence-based change practices, *Journal of Engineering Education*, 106(1), 1-10. DOI: [10.1002/jee.20152](https://doi.org/10.1002/jee.20152)
- Mansbach, R., Ferguson, A., Killian, K., Krogstadt, J., Leal, C., Schleife, A., Trinkle, D., West, M., & Herman, G. L. (2016). Reforming an undergraduate materials science curriculum with computational modules. *Journal of Materials Education*, 38(3-4), 161-174.
- Trenshaw, K. F., Revelo, R. A., Earl, K. A., & Herman, G. L. (2016). Using Self Determination Theory principles to promote engineering students' intrinsic motivation to learn. *International Journal of Engineering Education*, 32(3A), 1194-1207.
- Montfort, D. B., Herman, G. L., Brown S. A., Matusovich, H. M., & Streveler, R. A., Adesope, O. (2015). Patterns of student conceptual understanding across engineering content areas. *International Journal of Engineering Education*, 31(6A), 1587-1604.
- Herman, G. L., Zilles, C., & Loui, M. C. (2014). A psychometric evaluation of the Digital Logic Concept Inventory. *Computer Science Education*, 24(4), 277-303. DOI: [10.1080/08993408.2014.970781](https://doi.org/10.1080/08993408.2014.970781)
- Ogunfunmi, T., Herman, G. L., & Rahman, M. (2014). On the use of concept inventories for circuits and systems courses. *IEEE Circuits and Systems Magazine*, 14(3), 12-26. DOI: [10.1109/MCAS.2014.2333614](https://doi.org/10.1109/MCAS.2014.2333614)
- Trenshaw, K. F., Green, K. A., Goldberg, D. E., & Herman, G. L. (2014). Fostering motivation as a class objective in a large engineering class for second-year students: A narrative approach. *International Journal of Engineering Education*, 30(4), 837-847.
- Herman, G. L. (2012). Designing contributing student pedagogies to promote students' intrinsic motivation to learn, *Computer Science Education*, 22(4), 369-388. DOI: [10.1080/08993408.2012.727711](https://doi.org/10.1080/08993408.2012.727711).
- Herman, G. L., Loui, M. C., Kaczmarczyk, L., & Zilles, C. (2012). Describing the what and why of students' difficulties in Boolean logic. *ACM Transactions on Computing Education*, 12(1), 3:1-28. DOI: [10.1145/2133797.2133800](https://doi.org/10.1145/2133797.2133800)
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Herman, G. L., Zilles, C., & Loui, M. C. (2012). Flip-flops in students' conceptions of state. *IEEE Transactions on Education*, 55 (1), 88–98. DOI: [10.1109/TE.2011.2140372](https://doi.org/10.1109/TE.2011.2140372)

Herman, G. L., Loui, M. C., & Zilles, C. (2011). Students' misconceptions about medium-scale integrated circuits. *IEEE Transactions on Education*, 54 (4), 637-645. DOI: [10.1109/TE.2011.2104361](https://doi.org/10.1109/TE.2011.2104361)

Herman, G. L., Zilles, C., & Loui, M. C. (2011). How do students misunderstand number representations? *Computer Science Education*, 23 (3), 289-312. DOI: [10.1080/08993408.2011.611712](https://doi.org/10.1080/08993408.2011.611712)

Goldman, K., Gross, P., Heeren, C., Herman, G. L., Kaczmarczyk, L., Loui, M. C., & Zilles, C. (2010). Setting the scope of concept inventories for introductory computing subject. *ACM Transactions on Computing Education*, 10 (2), 5:1–29. DOI: [10.1145/1789934.1789935](https://doi.org/10.1145/1789934.1789935)

Peer-reviewed conference papers

Johnson-Glauch, N.E. & Herman, G. L. (2018, April). Student conceptions of stress and mechanical failure probed through different visual representations of material stress. Poster presented at the *2018 Illinois Indiana ASEE Section Conference*, West Lafayette, IN. (Best Poster Award)

Nip, T., Gunter, E., Herman, G. L., Morphew, J., West, M. (2018). Using a computer-based testing facility to improve student learning in a programming languages and compilers course, In *Proceedings of the ACM Special Interests Group on Computer Science Education (SIGCSE '18)*. (35% Acceptance Rate)

Herman, G., L. & Choi, D. S. (2017). The affordances and constraints of diagrams on students' reasoning about state machines, In *Proceedings of the 2017 ACM Conference on International Computing Education Research (ICER 2017)*, (pp. 173-181) Seattle, WA, August 18-20. DOI: [10.1145/3105726.3106172](https://doi.org/10.1145/3105726.3106172) (16% Acceptance Rate)

Kononov, A., Bellon, P., Bretl, T., Ferguson, A. L., Herman, G. L., Killian, K. A., Krogstad, J. A., Leal, C., Maass, R., Schleife, A., Shang, J. K., Trinkle, D. R., & West, M. (2017). Computational curriculum for MatSE undergraduates. In *Proceedings of the 2017 American Society for Engineering Education Annual Conference and Exposition*, (Paper ID #19440). Columbus, OH, June 25-28. <https://peer.asee.org/28060>

Johnson, N. & Herman, G. L. (2017). Students' conception and application of mechanical equilibrium through their sketches. In *Proceedings of the 2017 American Society for Engineering Education Annual Conference and Exposition*, (Paper ID #17998). Columbus, OH, June 25-28. <https://peer.asee.org/28869>

Amos, J. R., Bashir, R., Cross, K. J., Herman, G. L., Loewenstein, J., Pool, M. & Silverman, D. (2017). Defining the frontiers of Bioengineering Education at Illinois and beyond. In *Proceedings of the 2017 American Society for Engineering Education Annual Conference and Exposition*, (Paper ID #19347). Columbus, OH, June 25-28. <https://peer.asee.org/27871>

Faulkner, B. E., Herman, G. L. & Earl, K. (2017). Engineering faculty perspectives on student mathematical maturity. In *Proceedings of the 2017 American Society for Engineering Education Annual Conference and Exposition*, (Paper ID #19600). Columbus, OH, June 25-28. <https://peer.asee.org/27839>

Sherman, A. T., Oliva, L., DeLatte, D., Golaszewski, E., Neary, M., Patsourakos, K., Phatak, D., Scheponik, T., Herman, G. L. & Thompson, J. (2017). Creating a cybersecurity concept inventory: A status report on the CATS project. In *Proceedings of the 2017 National Cyber Summit*, Huntsville, AL, June 6-8. Available at <http://arxiv.org/abs/1706.05092>.

Tomkin, J., West, M. & Herman, G. L. (2016). A methodological refinement for studying the STEM grade-point penalty. In *Proceedings of the 46th ASEE/IEEE Frontiers in Education Conference*, Erie, PA, Oct. 12-15. DOI: [10.1109/FIE.2016.7757646](https://doi.org/10.1109/FIE.2016.7757646)

Minin, S., Varodayan, D., Schmitz, C., Faulkner, B. & Herman, G. L. (2016). Minority Merit: Improving Retention with Cooperative Learning in a First-Year Electronics Course. In *Proceedings of the 46th ASEE/IEEE Frontiers in Education Conference*, Erie, PA, Oct. 12-15. DOI: [10.1109/FIE.2016.7757611](https://doi.org/10.1109/FIE.2016.7757611)

Ma, S., Herman, G. L., West, M., Tomkin, J. & Mestre, J. (2016). Studying faculty communities of practice through social network analysis. In *Proceedings of the 46th ASEE/IEEE Frontiers in Education Conference*, Erie, PA, Oct. 12-15. DOI: [10.1109/FIE.2016.7757561](https://doi.org/10.1109/FIE.2016.7757561)

Herman, G. L. (2016). Studying how digital logic instructors solve canonical problems. In *Proceedings of the 46th ASEE/IEEE Frontiers in Education Conference*, Erie, PA, Oct. 12-15. DOI: [10.1109/FIE.2016.7757384](https://doi.org/10.1109/FIE.2016.7757384)

Scheponik, T., Herman, G. L., Oliva, L., Phatak, D., DeLatte, D. & Sherman, A. T. (2016). How students reason about cybersecurity concepts. In *Proceedings of the 46th ASEE/IEEE Frontiers in Education Conference*, Erie, PA, Oct. 12-15. DOI: [10.1109/FIE.2016.7757363](https://doi.org/10.1109/FIE.2016.7757363)

Faulkner, B. E. & Herman, G. L. (2016). Espoused faculty epistemologies for engineering mathematics: Towards defining “mathematical maturity” for engineering. In *Proceedings of the 2016 American Society for Engineering Education Annual Conference and Exposition*, (Paper ID #16914). New Orleans, LA, June 26-29. DOI: [10.18260/p.26735](https://doi.org/10.18260/p.26735)

Essick, R., Silva Sohn, M., West, M., Mercier, E., & Herman, G. L. (2016). Scaling-up collaborative learning for large introductory courses using active learning spaces, TA training, and computerized team management. In *Proceedings of the 2016 American Society for Engineering Education Annual Conference and Exposition*, (Paper ID #17099). New Orleans, LA, June 26-29. DOI: [10.18260/p.27342](https://doi.org/10.18260/p.27342)

Sanders, J., West, M., & Herman, G. L. (2016). Scaling-up project-based learning for a large introductory mechanics course using mobile phone data capture and peer feedback. In *Proceedings of the 2016 American Society for Engineering Education Annual Conference and Exposition*, (Paper ID #17119). New Orleans, LA, June 26-29. DOI: [10.18260/p.27341](https://doi.org/10.18260/p.27341)

Herman, G. L. & Johnson, N. E. (2016). Studying students' understanding of engineering concepts through their sketches. In *Proceedings of the 2016 American Society for Engineering Education Annual Conference and Exposition*, (Paper ID #17007). New Orleans, LA, June 26-29. DOI: [10.18260/p.25947](https://doi.org/10.18260/p.25947)

Herman, G. L., Hahn, L. D., & West, M. (2016). Sustaining innovation in engineering education through faculty communities. In *Proceedings of the 2016 American Society for Engineering Education Annual Conference and Exposition*, (Paper ID #16921). New Orleans, LA, June 26-29. DOI: [10.18260/p.25993](https://doi.org/10.18260/p.25993)

Cross, K. J., Mamaril, N., Johnson, N. E., & Herman, G. L. (2016). Understanding how a culture of collaboration develops among STEM faculty. In *Proceedings of the 2016 American Society for Engineering Education Annual Conference and Exposition*, (Paper ID #16917). New Orleans, LA, June 26-29. DOI: [10.18260/p.27099](https://doi.org/10.18260/p.27099)

Mansbach, R., Herman, G. L., West, M., Trinkle, D., Schleife, A., & Ferguson, A. (2016). Work-in-Progress: Computational Modules for the MatSE Undergraduate Curriculum. In *Proceedings of the 2016 American Society for Engineering Education Annual Conference and Exposition*, (Paper ID #16940). New Orleans, LA, June 26-29. DOI: [10.18260/p.27214](https://doi.org/10.18260/p.27214)

Herman, G. L. & Pittman, L. (2015). Studying students' understanding of engineering concepts through their use of engineering sketches, in *Proceedings of the Conference for Integrating Cognitive Science with Innovative Teaching in STEM Disciplines: Spatial Learning in STEM*, Evanston, IL, Sept. 18-19.

Herman, G. L. & Mena, I. (2015). Work in progress: Tracking the spread of research-based instructional strategies, In *Proceedings of the Forty-fifth ASEE/IEEE Frontiers in Education Conference*, (pp. 1179-1183). El Paso, TX, Oct. 21-24. DOI: [10.1109/FIE.2015.7344218](https://doi.org/10.1109/FIE.2015.7344218)

Faulkner, B. & Herman, G. L. (2015). Effect of assertion headings and expandable examples in an online engineering textbook, In *Proceedings of the Forty-fifth ASEE/IEEE Frontiers in Education Conference*, (pp. 1866-1874). El Paso, TX, Oct. 21-24. DOI: [10.1109/FIE.2015.7344329](https://doi.org/10.1109/FIE.2015.7344329)

Pittman, L. & Herman, G. L. (2015). Documenting students' faulty schema and misconceptions about combinations and permutations, In *Proceedings of the Forty-fifth ASEE/IEEE Frontiers in Education Conference*, (pp. 87-95), El Paso, TX, Oct. 21-24. DOI: [10.1109/FIE.2015.7344035](https://doi.org/10.1109/FIE.2015.7344035)

Streveler, R., Brown, S., Montfort, D., Herman, G. L., & Matusovich, H. (2015). Helping your students learn "Engineering-ese": Using the results of conceptual change research to inform your instruction, In *Proceedings of the Forty-fifth ASEE/IEEE Frontiers in Education Conference*, (pp. 658-659). El Paso, TX, Oct. 21-24. DOI: [10.1109/FIE.2015.7344126](https://doi.org/10.1109/FIE.2015.7344126)

Roesler, J., Littleton, P., Schmidt, A., Schideman, L., Johnston, M., Mestre, J., Herman, G. L., Mena, I., Gates, E., & Liu, L. (2015). Campus integrated project-based learning course in Civil and Environmental Engineering, In *Proceedings of the Forty-fifth ASEE/IEEE Frontiers in Education Conference*, (pp. 2202-2208). El Paso, TX, Oct. 21-24. DOI: [10.1109/FIE.2015.7344382](https://doi.org/10.1109/FIE.2015.7344382)

Herman, G. L., Hahn, L., & West, M. (2015). Coordinating college-wide instructional change through faculty communities, In *Proceedings of the 2015 International Mechanical Engineering Congress & Exposition*, (IMECE2015-51549). Houston, TX, Nov. 13-19. DOI: [10.1115/IMECE2015-51549](https://doi.org/10.1115/IMECE2015-51549)

West, M., Silva Sohn, M. & Herman, G. L. (2015). Sustainable reform of an introductory mechanics course sequence driven by a community of practice, In *Proceedings of the 2015 International Mechanical Engineering Congress & Exposition*, (IMECE2015-51493). Houston, TX, Nov. 13-19. DOI: [10.1115/IMECE2015-51493](https://doi.org/10.1115/IMECE2015-51493)

Herman, G. L., Earl, K. A., & Choi, D. S. (2015). Studying the fidelity of implementation of an intrinsic motivation course conversion, In *Proceedings of the 2015 American Society for Engineering Education Annual Conference and Exposition*, (pp. 26.1438.1-26.1438.15). Seattle, WA. June 14-17. DOI: [10.18260/p.24775](https://doi.org/10.18260/p.24775)

Fagen, W. A., Herman, G. L., & West, M. (2015). Reengineering an Introduction to Computing course within a College-Wide Community of Practice, In *Proceedings of the 2015 American Society for Engineering Education Annual Conference and Exposition*, (pp. 26.1303.1-26.1303.9). Seattle, WA. June 14-17. DOI: [10.18260/p.24640](https://doi.org/10.18260/p.24640)

Herman, G. L., Mena, I.B., Greene, J., West, M., Tomkin, J., & Mestre, J. (2015). Creating Institution-Level Change in Instructional Practices through Faculty Communities of Practice, In *Proceedings of the 2015 American Society for Engineering Education Annual Conference and Exposition*, (pp. 26.419.1-26.419.13). Seattle, WA. June 14-17. DOI: [10.18260/p.23758](https://doi.org/10.18260/p.23758)

West, M. & Herman, G. L. (2015). Mapping the Spread of Collaborative Learning Methods in Gateway STEM Courses via Communities of Practice, In *Proceedings of the 2015 American Society for Engineering Education Annual Conference and Exposition*, (pp. 26.1132.1-26.1132.11). Seattle, WA. June 14-17. DOI: [10.18260/p.24469](https://doi.org/10.18260/p.24469)

West, M. Herman, G. L., & Zilles, C. (2015). PrairieLearn: Mastery-based Online Problem Solving with Adaptive Scoring and Recommendations Driven by Machine Learning, In *Proceedings of the 2015 American Society for Engineering Education Annual Conference and Exposition*, (pp. 26.1238.1-26.1238.14). Seattle, WA. June 14-17. DOI: [10.18260/p.24575](https://doi.org/10.18260/p.24575)

West, M., Silva Sohn, M., & Herman, G. L. (2015). Randomized Exams for Large STEM Courses Spread via Communities of Practice, In *Proceedings of the 2015 American Society for Engineering Education Annual Conference and Exposition*, (pp. 26.1302.1-26.1302.15). Seattle, WA. June 14-17. DOI: [10.18260/p.24639](https://doi.org/10.18260/p.24639)

Dewji, N., Wolfman, S. A., Herman, G. L., Porter, L., Talyor, C., & Vahrenhold, J. (2015). The CS concept inventory quiz show. *SIGCSE 2015*, (pp. 669-670). March 4-7, Kansas, City, MO. DOI: [10.1145/2676723.2677315](https://doi.org/10.1145/2676723.2677315) (36% Acceptance Rate)

Herman, G. L. & Dodge, R. (2015). Creating assessment tools for cybersecurity education. *SIGCSE 2015*, (pp. 696-696). March 4-7, Kansas City, MO. DOI: [10.1145/2676723.2691863](https://doi.org/10.1145/2676723.2691863) (36% Acceptance Rate)

Trenshaw, K., Alonso, R. R., Earl, K., & Herman G. (2014). Events that promote engineering students' intrinsic motivation to learn, In *Proceedings of the 2014 American Society for Engineering Education Annual Conference and Exposition*, (pp. 24.551.1-24.551.9). Indianapolis, IN. June 15-18. Permalink: <https://peer.asee.org/20442>

Herman, G. L. & Crowley, L. (2014). Using faculty communities to drive sustainable reform: Learning from the Strategic Instructional Initiatives Program, In *Proceedings of the 2014 American Society for Engineering Education Annual Conference and Exposition*, (pp. 24.1329.1-24.1329.9). Indianapolis, IN. June 15-18. Permalink: <https://peer.asee.org/23262>

West, M. & Herman, G. L. (2014). Sustainable reform of Introductory Dynamics driven by a community of practice, In *Proceedings of the 2014 American Society for Engineering Education Annual Conference and Exposition*, (pp. 24.1148.1-24.1148.12). Indianapolis, IN. June 15-18. Permalink: <https://peer.asee.org/23081>

Streveler, R. A., Montfort, D. B., Herman, G. L., Brown, S. A., & Matusovich, H. M. (2014). Conceptual change across engineering disciplines, In *Proceedings of the 2014 American Society for Engineering Education Annual Conference and Exposition*, (pp. 24.309.1 - 24.309.9). Indianapolis, IN. June 15-18. Permalink: <https://peer.asee.org/20200>

Pawley, A. L., Carberry, A. R., Cardella, M. E., Carnasciali, M. I., Daly, S. R., Gorlewicz, J. L., Herman, G. L., Hynes, M. M., Jordan, S. S., Kellam, N. N., Lande, M., Verleger, M. A., & Yang, D. (2014). The PEER Collaborative: Supporting engineering education research faculty with near-peer mentoring unconference workshops. In *Proceedings of the 2014 American Society for Engineering Education Annual Conference and Exposition*, (pp. 24.1237.1-24.1237.19). Indianapolis, IN. June 15-18. Permalink: <https://peer.asee.org/23170>

Trenshaw, K. F., Alonso, R. R., Earl, K., & Herman G. (2013). Exploring the student experience in low-cost intrinsic motivation course conversions, In *Proceedings of the Forty-Third ASEE/IEEE Frontiers in Education Conference*. (pp. 78-79), Oklahoma City, OK, October 23-26. DOI: [10.1109/FIE.2013.6684792](https://doi.org/10.1109/FIE.2013.6684792)

Herman, G., Trenshaw, K. Goldberg, D. E., Stolk, J., & Somerville, M. (2013). Creating an intrinsic-motivation-driven course design method, In *Proceedings of the Forty-Third ASEE/IEEE Frontiers in Education Conference*. (pp. 1203-1209), Oklahoma City, OK, October 23-26. DOI: [10.1109/FIE.2013.6685021](https://doi.org/10.1109/FIE.2013.6685021)

Bhat, S. & Herman, G. L. (2013) Student perceptions of differences in visual communication mode for an online course in engineering, In *Proceedings of the Forty-Third ASEE/IEEE Frontiers in Education Conference*. (pp. 1471-1473), Oklahoma City, OK, October 23-26. DOI: [10.1109/FIE.2013.6685079](https://doi.org/10.1109/FIE.2013.6685079)

Montfort, D. B., Herman, G. L., Brown, S. A., Matusovich, H. M., Streveler, R. A. (2013). Novice-led paired thematic analysis: A method for conceptual change in engineering, In *Proceedings of the 2013 American Society for Engineering Education Annual Conference and Exposition*, (pp. 23.933.1-23.933.9). Atlanta, GA. June 23-26. Permalink: <https://peer.asee.org/22318>

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Herman, G. L., Trenshaw, K. & Rosu, L. (2012). Work-in-progress: Empowering teaching assistants to become agents of education reform. In *Proceedings of the Forty-Second ASEE/IEEE Frontiers in Education Conference*. (pp. 285-286), Seattle, WA, October 3-6. [10.1109/FIE.2012.6462322](https://doi.org/10.1109/FIE.2012.6462322)

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Herman, G. L., Montfort, D., & Brown, S., & Streveler, R. (2012). Work-in-progress: Do students need to learn to speak “Engineering-ese?” Conceptual change as language acquisition in Engineering. In *Proceedings of the Forty-Second ASEE/IEEE Frontiers in Education Conference*. (pp. 401-402), Seattle, WA, October 3-6. DOI: [10.1109/FIE.2012.6462325](https://doi.org/10.1109/FIE.2012.6462325)

Goldberg, D. E., Herman, G. L., Somerville, M., & Stolk, J. (2012). Creating learning environments that support intrinsic motivation: Exploring the alternatives. In *Proceedings of the Forty-Second ASEE/IEEE Frontiers in Education Conference*. (pp. T3E-1 to T3E-2), Seattle, WA, October 3-6.

Torres, A. T., & Herman, G. L., (2012). Motivating learners: A primer for engineering teaching assistants, In *Proceedings of the 2012 American Society for Engineering Education Annual Conference and Exposition*, (pp. 25.949.1-25.949.18). San Antonio, TX. June 10-13. Permalink: <https://peer.asee.org/21706>

Herman, G. L., & Loui, M. C. (2012). Identifying the core conceptual framework of digital logic, In *Proceedings of the 2012 American Society for Engineering Education Annual Conference and Exposition*, (pp. 25.712.1-25.712.13). San Antonio, TX. June 10-13. Permalink: <https://peer.asee.org/21469>

Herman, G. L., Goldberg, D. E., Green, K., & Somerville, M. (2012). Creating low-cost intrinsic motivation course conversions in a large required engineering course, In *Proceedings of the 2012 American Society for Engineering Education Annual Conference and Exposition*, (pp. 25.357.1-25.357.25). San Antonio, TX. June 10-13. Permalink: <https://peer.asee.org/21115>

Handzik, J., & Herman, G. L. (2011). Work in progress: Developing a cognitively based digital logic calculator. *Proceedings of the Forty-first ASEE/IEEE Frontiers in Education Conference*, (pp. T2E-1 to T2E-3). Rapid City, SD. Oct. 27-30. DOI: [10.1109/FIE.2011.6142934](https://doi.org/10.1109/FIE.2011.6142934)

Herman, G. L., & Loui, M. C. (2011). Administering a Digital Logic Concept Inventory at multiple institutions. *Proceedings of the 2011 American Society for Engineering Education Annual Conference and Exposition*, (pp. 22.142.1-22.142.12). Vancouver, BC. June 26-29. Permalink: <https://peer.asee.org/17423>

Herman, G. L. (2011). Teaching signal processing according to what your students know. *Proceedings of the Sixth Signal Processing Education Workshop*, (pp. 231–236). Sedona, AZ, January 4-7. DOI: [10.1109/DSP-SPE.2011.5739217](https://doi.org/10.1109/DSP-SPE.2011.5739217)

Herman, G. L. & Handzik, J. (2010). A preliminary pedagogical comparison study using the Digital Logic Concept Inventory. *Proceedings of the Fortieth ASEE/IEEE Frontiers in Education Conference*, (pp. F1G-1 to F1G-6). Arlington, VA, October 27-30. DOI: [10.1109/FIE.2010.5673591](https://doi.org/10.1109/FIE.2010.5673591)

Herman, G. L., Loui, M. C., & Zilles, C. (2010). Work in Progress: How do engineering students misunderstand number representations? *Proceedings of the Fortieth ASEE/IEEE Frontiers in Education Conference*, (pp. T3G-1 to T3G-2), Arlington, VA, October 27-30. DOI: [10.1109/FIE.2010.5673585](https://doi.org/10.1109/FIE.2010.5673585)

Herman, G. L., Loui, M. C., & Zilles, C. (2010). Creating the Digital Logic Concept Inventory. *Proceedings of the Forty-First ACM Technical Symposium on Computer Science Education*, (pp. 102–106), Milwaukee, WI, March 10-13. DOI: [10.1145/1734263.1734298](https://doi.org/10.1145/1734263.1734298) (34% Acceptance Rate)

Kaczmarczyk, L., Petrick, E., East, J. P., & Herman, G. L. (2010). Identifying student misconceptions of programming. *Proceedings of the Forty-First ACM Technical Symposium on Computer Science Education*, (pp. 107–111), Milwaukee, WI, March 10-13. DOI: [10.1145/1734263.1734299](https://doi.org/10.1145/1734263.1734299) (34% Acceptance Rate)

Herman, G. L., Zilles, C. & M. C. Loui. (2009). Work in Progress: Students' misconceptions about state in digital systems. *Proceedings of the Thirty-Ninth ASEE/IEEE Frontiers in Education Conference*, (pp. T4D-1 to T4D-2), San Antonio, TX, October 18-21. DOI: [10.1109/FIE.2010.5673591](https://doi.org/10.1109/FIE.2010.5673591)

Herman, G. L., Kaczmarczyk, L., Loui, M. C., & Zilles, C. (2008). Proof by incomplete enumeration and other logical misconceptions, *Proceedings of the 2008 ACM Conference on International Computing Education Research (ICER 2008)*, (pp. 59–70) Sydney, Australia, September 6-7. DOI: [10.1145/1404520.1404527](https://doi.org/10.1145/1404520.1404527) (35% Acceptance Rate)

Goldman, K., Gross, P., Heeren, C., Herman, G. L., Kaczmarczyk, L., Loui, M. C., & Zilles, C. (2008). Identifying important and difficult concepts in fundamental computing courses using a Delphi process. *Proceedings of the Thirty-Ninth ACM Technical Symposium on Computer Science Education*, (pp. 256–260), Portland, OR, March 12–15. DOI: [10.1145/1352135.1352226](https://doi.org/10.1145/1352135.1352226) (31% Acceptance Rate)

Other publications

Morphew, J.W., Silva-Sohn, M., Herman, G., & West, M. (2019). Improving mathematical problem-solving in an introductory engineering course with the testing effect. Paper presentation at the Annual Meeting of the American Education Research Association. Toronto, Canada. April 5-9.

Herman, G. L., Cheville, A., Yang, D., Streveler, R. A., Brown, S. A., Menekse, M., Self, B. P., Svilha, V., Koretsky, M., Brophy, S. P., Goodridge, W. H., Husman, J., Sohoni, S. A. (2017). Creating capacity and funding for studying how students learn engineering. In *Proceedings of the 2017 American Society for Engineering Education Annual Conference and Exposition*, (Special Session). Columbus, OH, June 25-28.

Herman, G. L. (2011). *The Development of a Digital Logic Concept Inventory*, Unpublished Doctoral Dissertation, University of Illinois at Urbana-Champaign, May.

Herman, G. L., (2007). *Fundamental Frequency Tracking in Music with Multiple Voices*, M.S. Thesis, University of Illinois at Urbana-Champaign, December.

Invited Workshops

Dagstuhl Seminar: Notional Machines and Programming Language Semantics in Education, Feb. 2019, Wadern, Germany.

Engineering Education Research & Innovation Impact Summit, NSF-sponsored workshop, Sept. 2018, West Lafayette, IN

Connecting Discipline-Based Education Researchers and Cognitive Scientists, NSF-sponsored workshop, Sept. 2016, Washington D.C.

Research Integration of Early Findings from Institution Transformation Projects, NSF-sponsored workshop, April 2016, Washington D.C.

Connecting Concepts across the Curriculum: From digital logic to distributed computing, NSF-sponsored workshop, Feb. 2016, Baton Rouge, LA.

Dagstuhl Seminar: Assessing Learning in Introductory Computer Science, Feb. 2016, Wadern, Germany.

Designing Low-Cost Intrinsic-Motivation Course Conversions, NSF C2GEN (Chautauqua Second Generation) Synchronous Online Professional Development Program, Oct-Nov. 2014.

Externally-Funded Grants

Herman, G. L. (PI), SFS-Capacity: Collaborative: Validation of Concept Assessment Tools for Cybersecurity. (In Collaboration with A. T. Sherman, L. Oliva, & D. Phatak of University of Maryland, Baltimore County). National Science Foundation, \$190,033: 2018-2021. DGE 1820531.

Herman, G. L. (PI), *Creating a Cybersecurity Curriculum Assessment Tool*. (In collaboration with A. T. Sherman, L. Oliva, & D. Phatak of University of Maryland, Baltimore County). Department of Defense, \$128,495.77: 2017-2018. CNAP-CAE Grant# H98230-17-1-03473.

Bashir, R. (PI), Loewenstein, J., Amos, J., Herman, G. L., Boppart, S. *Defining the Frontiers of Bioengineering Education at Illinois and Beyond*. National Science Foundation, IUSE/PFE:RED, \$1,998,057, 2016-2021. EEC 1623141.

Herman, G. L. (PI) & Pembridge, J. *Conference Title: Research Integration of Early Findings from Institution Transformation Projects*. National Science Foundation, IUSE, \$45,808: 2016-2017. DUE 1622893.

Herman, G. L. (PI), Litchfield, B., Amos, J., & Rapti, Z. *MATH:EAGER Understanding faculty barriers in adopting evidence-based integrated mathematics curricula*. National Science Foundation, IUSE, \$299,207: 2015-2017. DUE 1544388.

Herman, G. L. (PI) *Creating concept and curriculum assessment tools for Cybersecurity* (In collaboration with A. T. Sherman, L. Oliva, & D. Phatak of University of Maryland, Baltimore County). Department of Defense, \$147,099: 2015-2016. BAA-00-15, NSA H98230-15-1-0273.

Mercier, E. (PI), Herman, G. L., & Peschel, J. *Fostering collaborative drawing and problem solving through digital sketch and touch*. National Science Foundation, Cyberlearning, \$549,995: 2014-2017. IIS 1441149.

Herman, G. L. (PI). & Peschel, J. *Exploring expert & novice graphical communication through digital sketching*. National Science Foundation, Research in Engineering Education, \$248,239: 2014-2017. EEC 1429348.

Mestre, J. (PI), Greene, J., Herman, G. L., Tomkin, J., & West, M. *Scaling cultures of collaboration: Evidence-based reform in portal STEM courses*. National Science Foundation, Widening Implementation & Demonstration of Evidence-Based Reforms, \$2,000,000: 2014-2017. DUE 1347722

Loui, M. C. (PI), Herman, G. L., & Goldberg, D. E. *Enhancing Intrinsic Motivation in Core Engineering Courses*. National Science Foundation, Transforming Undergraduate Education in Science, Technology, Engineering, and Mathematics, \$200,000: 2012-2014. DUE 1140554

Instructional Grants

Herman, G. L. *Designing visualizations to enhance trace-based coding*. Provost's Initiative on Teaching Advancement (PITA), University of Illinois at Urbana-Champaign, \$13,500: 2017-2018.

Herman, G. L., Schmitz, C., Varodayan, D., Minin, S., Goddard, L., Loui, M. C., Kudeki, E., Franke, P. *Improving students' learning and experience in ECE 110*. Strategic Instructional Initiatives Program, University of Illinois at Urbana-Champaign, College of Engineering, \$49,500: 2014-2015.

Herman, G. L., Faulkner, B., Varodayan, D. *Exploring the creation of effective instructional text*. Grants for the Advancement of Teaching in Engineering (GATE) Program, College of Engineering, University of Illinois at Urbana-Champaign, \$18,900: 2014-2015.

Bhat, P. B., Do, M., & Herman G. L. *Harnessing Multiple Modes of Visual Communication to Enhance the Student Experience in Distance Learning*. Grants for the Advancement of Teaching in Engineering (GATE) Program, College of Engineering, University of Illinois at Urbana-Champaign, \$15,000: 2013-2014.

Jones, D. L., Lumetta, S. S., Brunet, M. C., Chen, D., Haken, L., Herman, G. L., Hu, Y.C., Kalbarczyk, Z., Kindratenko, V., Kudeki, E., Kumar, R., Mitra, S., Patel, S., & Vasudevan, S., Loui, M. C., Vaidya, N. *Creating the World's Best Computer Engineering Core*. Strategic Instructional Initiatives Program, University of Illinois at Urbana-Champaign, College of Engineering, \$300,000: 2012-2014.

Professional Memberships

- Association for Computing Machinery (ACM) Special Interest Group on Computer Science Education
- Institute of Electrical and Electronics Engineers (IEEE)
 - Signal Processing Society
 - Education Society
- American Society for Engineering Education (ASEE)
 - Educational Research and Methods Division
 - Student Division
 - New Engineering Educators Division
 - Electrical and Computer Engineering Division

Consulting

Engineering Education Consultant with Quality Evaluation Designs

Oct. 2011 – Dec. 2012

- External evaluator of the Philosophy of Engineering Education Community of Practice's use of NSF funding

Service

Professional Service

- ACM 2018 International Computing Education Research Conference, Program Committee
- ACM 2018 Special Interest Group, Computer Science Education Annual Conference, Program Committee
- ASEE Educational Research and Methods Division, Publications Chair, Since 2016
- Shedd Science Department Curriculum Reviewer for University Laboratory High School, 2015.
- Conference Organizer for the PEER Collaborative National Workshop, 2014.
 - Created professional development activities for tenure-track engineering education faculty
 - Created ongoing peer-mentoring networks
- Peer reviewer
 - Journal of STEM Education Research, Since 2018
 - Journal of Cybersecurity Education and Practice, Since 2018
 - Journal of Parallel and Distributed Computing, Since 2017
 - ACM Transactions on Computing Education, Since 2016.
 - National Science Foundation grant proposals reviewer, Since 2012.
 - Journal of Computer Science Education, since 2014.
 - Journal of Higher Education, Since 2013.
 - Teaching and Learning Inquiry, Since 2013.
 - IEEE Transactions on Education, Since 2012.
 - Advances in Engineering Education, Since 2012.
 - Journal of Engineering Education, Since 2011.
 - ASEE/IEEE Frontiers in Education Conference, Since 2009.
 - ASEE Annual Conference and Exposition, Since 2008.
- ASEE Educational Research and Methods Division Webmaster, 2014-2015.
- Graduate Engineering Education Consortium for Students, Immediate Past Chair, 2010–2012.
 - Advised the group.
 - Sponsored professional development webinars.
- ASEE Student Division Information Chair, 2010-2012.
 - Restructured the Student Division leadership
 - Wrote bi-monthly newsletter.
- Signal Processing Education Network Student Liaison, 2011–2012.

Campus Service and Involvement

- Computer Science Graduate Fellowships, Admissions, and Awards Committee, 2016-2018
- Academy for Excellence in Engineering Education, 2012-2018
 - Developed instructional workshops for new faculty
 - Developed co-teaching program to train new faculty in instructional best practices.
- Faculty advisor: American Society for Engineering Education: Univ. of Illinois student chapter, 2012-2015.
- College Teaching Effectiveness Network Steering Committee, 2009-2011.
 - Maintained organization records and finances.
 - Organized seminars for various teaching topics including grading methods, academic job searches, and incorporating technology in the classroom.
- Instructor for campus-wide teaching assistant training program, 2008-2014.