

Martin K. Yeh

Associate Professor
College of Information Sciences and Technology
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Education

Ph.D., Penn State University, 2009 (Instructional Systems).

Thesis: Toward understanding the cognitive processes of software design in novice programmers.

Advisors: Dr. Christopher Hoadley and Dr. Kyle Peck.

Graduate course work, Penn State University, 2002–2003 (Management Science and Information Systems).

M.Eng., Penn State University, 2001 (Computer Science and Engineering).

B.S., Tamkang University, 1993 (Computer Science and Information Engineering).

Academic Appointments

Associate Professor of Information Sciences and Technology, 2022–present. The Pennsylvania State University, Brandywine (Tenured).

Assistant Professor of Information Sciences and Technology, 2015–2022. The Pennsylvania State University, Brandywine (Tenure track).

Assistant Professor of Computer Science & Engineering, 2009–2015. The Pennsylvania State University, University Park. (Non-tenure track)

Research

Referred Journal Articles

- J1. Zhuang, Y., Yan, Y., DeLong, L. A., & Yeh, M. K. (2023). Do developer perceptions have borders? Comparing C code responses across continents. *Software Quality Journal*. <https://doi.org/10.1007/s11219-023-09654-0>. (Impact factor: 1.983; H-index: 45)
- J2. Ritter, F. E., **Yeh, M. K.**, McDermott, A. F., & Weyhrauch, P. W. (2023). The effect of task fidelity on learning curves: a synthetic analysis. *International Journal of Human-Computer Interaction*, (39)11, 2253-2267. (Impact factor: 3.353; H-index: 76)
- J3. Lin, Y.-T., **Yeh, M. K.-C.**, & Tan, S.-R. (2022). Teaching programming by revealing thinking process: Watching experts' live coding videos with reflection annotations. *IEEE Transactions on Education*, (65)4, 617-627. <https://doi.org/10.1109/TE.2022.3155884> (Impact factor: 2.116; H-index: 71)
- J4. Tsai, C.-T., Wu, J.-L., Lin, Y.-T., & **Yeh, M. K.-C.** (2022). Design and development of a blockchain-based secure scoring mechanism for online learning. *Educational Technology & Society*, 25(3), 105–121. (Impact factor: 2.086; H-index: 88)
- J5. **Yeh, M. K.-C.**, Yan, Y., Zhuang, Y., & DeLong, L. A. (2021). Identifying program confusion using electroencephalogram measurements. *Behaviour & Information Technology*, 41(12), 2528-2545. <https://doi.org/10.1080/0144929X.2021.1933182> (Impact factor: 3.156; H-index: 78; 10% acceptance rate)
- J6. Wang-Trexler, N., **Yeh, M. K.-C.**, Diehl, W. C., Heiser, R. E., Gregg, A., Tran, L., & Zhu, C. (2021). Learning from doing: Lessons learned from designing and developing an

- educational software within a heterogeneous group. *International Journal of Web-Based Learning and Teaching Technologies*, 16 (4), 33–46.
<http://doi.org/10.4018/IJWLTT.20210701.0a3> (Impact factor: 1.58; H-index: 12)
- J7. Chuang, T.-Y., **Yeh, M. K.-C.**, & Lin, Y.-L. (2021). The impact of gaming playing on students' reasoning ability, varying according to their cognitive style. *Educational Technology & Society*, 24(3). (Impact factor: 2.086; H-index: 88)
- J8. Lin, Y.-T., **Yeh, M. K.-C.**, & Hsieh, H.-L. (2021). Teaching computer programming to science majors by modeling. *Computer Applications in Engineering Education*, 29(1), 130–144. <http://doi.org/10.1002/cae.22247> (Impact factor: 0.856; H-index: 29)
- J9. Ritter, F. E., **Yeh, M. K.-C.**, Yan, Y., Siu, K.-C., & Oleynikov, D. (2020). Effects of varied surgical simulation training schedules on motor-skill acquisition. *Surgical Innovation*, 27(1), 68–80. <http://doi.org/10.1177/1553350619881591> (Impact factor: 2.058; H-index: 47)
- J10. Wang, N., Gregg, A., **Yeh, M. K.-C.**, Heiser, R., & Diehl, W. (2019). Pet avatars, performance visualization, and social presence. *International Journal of Technology in Teaching and Learning*, 15(1), 18–31. (28–30% acceptance rate)
- J11. **Yeh, M. K.-C.** (2018). Examining novice programmers' software design strategies through verbal protocol analysis. *International Journal of Engineering Education*, 34(2) 458–470. (Impact factor: 0.653; H-index: 50)
- J12. Haughton, N., **Yeh, K.-C.**, Nworie, J., & Romero, L. (2013). Digital disturbances, disorders, and pathologies: A discussion of some unintended consequences of technology in higher education. *Educational Technology*, 53(4), 3–16. [Lead article]
- J13. **Yeh, K.-C.**, Gregory, J., & Ritter, F. E. (2010). One laptop per child: Polishing up the XO Laptop user experience. *Ergonomics in Design*, 18(3), 8–13. [Lead article] (Impact factor: 1.06; H-index: 21)

Book

- B1. Ritter, F. E., Clase, A. C., Harvill, S. L., **Yeh, M. K.-C.**, Joseph, R. E., Oury, J. J., Oury, J. D., Glantz, E. J., Fenstermacher, A., Brener, M., & James, J. J. (2021). *Skills to Obstruct Pandemic: How to protect yourself and your community from COVID-19 and similar infections*. Sunbury Press.

Conference Papers

- C1. Matsumuro, M., Oury, J., Ricupero, S., Ritter, F. E., **Yeh, M. K.**, & Endsley, M. (2023). *Automatically computing visual saliency to support situation awareness* [Paper presentation]. Human Factors and Ergonomics Society's 2023 International Annual Meeting. Washington, D. C. USA.
- C2. **Yeh, M. K.**, & Chen, W. (2023). *Investigating higher education teachers' perceptions of ChatGPT and the factors influencing their acceptance and rejection*. [Paper presentation]. Association for Educational Communications & Technology (AECT) Conference, Orlando, FL, USA.
- C3. Mao, J., **Yeh, M. K.-C.**, Polachek, D., Sockman, B. R., & Frantzfy, K. (2022). *Preservice teachers' knowledge of and perspectives on social and emotional learning environments through mindfulness meditation*. [Paper presentation]. Association for Educational Communications & Technology (AECT) Conference, Las Vegas, NV, USA.

- C4. Ricupero, S., Oury, J., **Yeh, M. K.-C.**, Tehranchi, F., McDermott, A. F., & Weyhrauch, P. W. (2021). *Testing a learning and retention theory with a complex task with 3- to 14-day retention intervals* [Paper presentation]. MathPsych/ICCM 2021 Conference. (online).
- C5. **Yeh, M. K.-C.**, Lin, P.-H., & D'Imperio, N. (2020). *The effect of motivation on learners' performance and satisfaction under flipped strategy in discrete math* [Paper presentation]. Frontiers in Education (FIE) Conference, Uppsala Sweden (online).
- C6. **Yeh, M. K.-C.**, Gregg, A., Wang, N., & Yu, A. H.-C. (2019). *Enhancing online social presence with the Social Performance Optimization Tool (SPOT)* [Poster presentation]. Association for Educational Communications & Technology (AECT) Conference, Las Vegas, NV, USA.
- C7. Lewis, R., Mello, C. A., Zhuang, Y., **Yeh, M. K.-C.**, Yan, Y., & Gopstein, D. (2018). Rough sets: Visually discerning neurological functionality during thought processes. In M. Ceci, N. Japkowicz, J. Liu, G. Papadopoulos, & Z. Raś (Eds) *Foundations of Intelligent Systems, ISMIS 2018, Lecture Notes in Computer Science, vol 11177* (pp. 32–41). Springer. https://doi.org/10.1007/978-3-030-01851-1_4.
- C8. **Yeh, M. K.-C.**, Yan, Y., Gopstein, D., & Zhuang, Y. (2017). *Detecting and comparing brain activity in short program comprehension using EEG* [Paper presentation]. Frontiers in Education (FIE) Conference, Indianapolis, IN, USA.
- C9. Gopstein, D., Iannacone, J., Yan, Y., DeLong, L. A., Zhuang, Y., **Yeh, M. K.-C.**, & Cappos, J. (2017). *Understanding misunderstandings in source code* [Paper presentation]. 11th Joint Meeting on Foundations of Software Engineering (FSE). Paderborn, Germany. [Distinguished Paper Award]
- C10. **Yeh, M. K.-C.**, Toshtzar, A., Guertin, L., & Yan, Y. (2016). *Using spaced repetition and gamification to enhance K-12 student science literacy with on-demand mobile short reads* [Paper presentation]. Frontiers in Education (FIE) Conference, 2016 (pp. 1-4), Erie, PA, USA.
- C11. Shaffer, S., **Yeh, M. K.-C.**, & Iwinski, T. (2015). *Designing the ideal assessment system to support mastery learning of computer programming in an online environment* [Paper presentation]. American Society for Engineering Education (ASEE) Spring 2015 Middle Atlantic Section (pp. 148–160). PA, USA.
- C12. Cappos, J., Zhuang, Y., Oliveira D., Rosenthal, M., & **Yeh, M. K.-C.** (2014). *Vulnerabilities as blind spots in developer's heuristic-based mental models* [Paper presentation]. New Security Paradigms Workshop, Victoria, BC, Canada.
- C13. Rosenthal, M., Morin, N., **Yeh, M. K.-C.**, Cappos, J., Zhuang, Y., & Oliveira, D. (2014). *It's the psychology stupid: How heuristics explain software vulnerabilities and how priming can illuminate developer's blind spots* [Paper presentation]. Annual Computer Security Applications Conference, New Orleans, LA, USA.
- C14. Ritter, F. E., **Yeh, K.-C.**, Cohen, M. A., Weyhrauch, P. W., Kim, J. W., & Hobbs J. N. (2013). *Declarative to procedural tutors: A family of cognitive architecture-based tutors* [Paper presentation]. Behavior Representation in Modeling and Simulation (BRIMS) Conference (pp. 108–113). Centerville, OH, USA.
- C15. **Yeh, M. K.-C.**, Xie, Y., & Ke, F. (2011). *Teaching computational thinking to non-computing majors using spreadsheet functions*. Frontiers in Education (FIE) Conference (pp. F3J1–F3J5). Rapid City, SD, USA.

- C16. **Yeh, M. K.-C.**, & Chen, W. (2011). *WIP: Using a computer gaming strategy to facilitate undergraduates' learning in a computer programming course: An experimental study*. Frontiers in Education Conference (pp. S4H1–S4H2), Rapid City, SD USA.
- C17. Ritter, F. E., & **Yeh, M. K.-C.** (2011). A mobile tool to help users moderate caffeine intake by displaying caffeine pharmacokinetics and pharmacodynamics. In R. Goebel, J. Siekmann, & W. Wahlster (Eds.), *Foundations of Augmented Cognition. Directing the Future of Adaptive Systems* (pp. 528–535). Springer. <http://doi.org/10.1007/978-3-642-21852-1>.
- C18. **Yeh, M. K.-C.** (2009). *Using an educational computer game as a motivational tool for supplemental instruction delivery* [Paper presentation]. Annual Society for Information Technology and Teacher Education (SITE) International Conference, Charleston, SC, USA.
- C19. Chen, W., & **Yeh, M. K.-C.** (2006). *Work in progress: Creating a case-based reasoning digital library to improve learning in an introductory programming course*. Frontiers in Education (FIE) Conference, San Diego, CA. <http://doi.org/10.1109/FIE.2006.322392>.
- C20. **Yeh, M. K.-C.** (2005). *What does a one-to-one computer environment mean to teachers in an elementary school? Teacher's perception of one-to-one laptop computers in classrooms* [Paper presentation]. Association for Educational Communications and Technology (AECT) Conference, Orlando, FL, USA.
- C21. Cox, C., Nguyen, H., Xie, Y., **Yeh, M. K.-C.**, & Sharma, P. (2004). *Defining leadership for college students: A needs assessment approach*. In G. Rice & D. Baker (Eds.) Proceedings of the Thirty-Four Annual Conference of the International Society for Exploring Teaching and Learning (pp. 58–59), ISETL.
- C22. Peck, K., Popp, J. D., Haughton, H., & **Yeh, M. K.-C.** (2001). *PT3 database project* [Paper presentation]. Association for Educational Communications and Technology (AECT) Conference, Atlanta, GA, USA.

Presentations and Invited Talks

- P1. **Yeh, M. K.-C.** (2019). How to be a successful graduate student in the US. National Normal University, Taiwan. 17 June 2019.
- P2. **Yeh, M. K.-C.** (2018). Exploring the root causes of recurring issues in software development from human factors perspectives. Research centre on Interactive media, Smart systems and Emerging technologies (RISE). Nicosia, Cyprus. 1 November 2018.
- P3. **Yeh, M. K.-C.** (2011). Design and evaluation mobile learning applications using HCI principles. Department of Educational Technology. Tamkang University, Taiwan. 1 June 2011.

Research Grants and Support

- G1. Charles River Analytics. (May 2022–December 2023). “Probabilistic Engine for Representing and Computing Enhanced Presentation Techniques for Situation Awareness.” Ritter (PI). **Yeh** (Co-PI). \$700k.
- G2. Schreyer Institute for Teaching Excellence (August 2019). “The Effect of Academic Motivation and Readiness in the Outcome of Using a Flipped Pedagogical Strategy in a College Mathematics Course.” **Yeh** (PI). \$600. (Conference support)
- G3. Penn State Global Programs (April 2019–March 2020). “Leveraging Human Brainwave and Eye Gaze to Harness the Theory of Computer Program Comprehension.” **Yeh** (PI). \$5k.

- G4. Charles River Analytics & Office and Naval Research. (April 2018–December 2021). “STTR: Simulating Training Results to Understand Differing Effects of Fidelity on Learning (STRUDEL).” Ritter (PI). **Yeh** (Co-PI). \$113k.
- G5. Charles River Analytics & Office and Naval Research. (July 2017–July 2018). "STTR: Support for SAVE-IT: A System for Analyzing and Visualizing Evaluations of Instruction Techniques." Ritter (PI). **Yeh** (Co-PI). \$70k.
- G6. Center for Online Innovation in Learning (January 2017–June 2018). "Beyond Data Dashboards: The Effects of Social Performance Visualizations on Learner Progress and Peer-to-Peer Interaction." Wang (PI). Garbrick, Gregg, Leitzell, Peck, Pursel, and **Yeh** (Co-PI). Sponsor: Center for Online Innovation in Learning, Penn State. January 2017–June 2018. \$40K.
- G7. Office of Naval Research (April 2015–December 2021). “Maintenance Training under Uncertainty: Expanding a Smart Tutoring System to Support Acquisition and Retention of Skills.” Ritter (PI). **Yeh** (Co-PI). \$3.4m.
- G8. Charles River Analytics & Office and Naval Research (2015–2017). “Building Trauma Triage Tutors for Air Force Nurses and Extending Learning Theory.” (SBIR phase II with Charles River Analytics.) Ritter (PI). **Yeh** (Co-PI). \$240k.
- G9. Charles River Analytics & Office and Naval Research (May 2015–October 2015). “CRAM-LESS: Exploring Strategy Learning in a Diagnostic Reasoning Task.” (STTR with Charles River Analytics.) Ritter (PI). **Yeh** (Co-PI). \$30k.
- G10. National Science Foundation. (January 2015–December 2016). “Using Cognitive Techniques to Detect and Prevent Security Flaws.” Cappos (PI). **Yeh** and Zhuang (Co-PIs). \$240k (\$100k to Penn State).
- G11. Charles River Analytics & Office and Naval Research (June 2011–December 2011). “STTR: Support for high-level tools for faster tutoring.” Ritter (PI). Haynes and **Yeh** (Co-PIs). \$49.7k.
- G12. Schreyer Institute for Teaching Excellence, Penn State. (2010). “The IQs System—an intelligent quiz system for mobile learning.” **Yeh** (PI). \$1.1k.

Awards

- A1. Priscilla Clement Award, 2019, Penn State Brandywine.
- A2. CaffeineZone (iPhone app) nominated, 2013 PA Tech Award.
- A3. Distinguished Paper Award, 2017, 11th joint meeting of the European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering.

Professional Experience

At Penn State

- Web Support Graduate Assistant, 2007
- ActionScript Developer, Summer 2006
- Learning Skill Center Coordinator, 2006
- Web Developer/System Administrator, 2000

Industry

- Software engineer, Skanhex Technology Inc. 1997
- Software engineer, Avigramm Technology Inc. 1997
- Software engineer, Behavior Tech Computer Corp. 1996

System engineer, Total Integra Technology Inc. 1995

Teaching and Advising

Teaching

Information Sciences & Technology, Penn State (* indicates course revision):

CYBER 262: Cyber defense studio
IST 110: Introduction to information sciences and technology
IST 111S: Seminar in IST
IST 210: Organization of data
IST 220: Networking and telecommunications
IST 230: Language, logic, and discrete mathematics
IST 250: New media and the Web
IST 255: Fundamentals of web administration
IST 256: Programming for the web
IST 260w: Introduction to systems analysis and design
IST 261: Application development design studio I
IST 311: Object-oriented design and software applications
IST 331*: Organization & design of information systems: Users & system principles
IST 440W: Information sciences and technology integration and problem solving
IST 451: Network security
SRA 111: Introduction to security and risk analysis
SRA 356: Statistical analysis for information sciences

Computer Science & Engineering, Penn State

CMPSC 201: C++ programming for engineers
CMPSC 203: Introduction to spreadsheets and databases
CMPSC 221: Object-oriented programming with web apps
CSE 297x: Introduction to programming with PHP
CSE 397x: Intermediate programming with PHP and MySQL

Undergraduate and Graduate Student Advising

Dr. Nicole Wang, 2017–2020.

Renusree Bandaru, undergraduate researcher, Summer 2020, Multi-campus REU.

Dr. Yu April Yan, 2016–2019.

Nick McManus, undergraduate researcher, 2018 – 2019.

Himani Vommi, undergraduate researcher, 2019 – 2019.

Abtin Toshtzar, undergraduate researcher, 2016 – 2018.

Juwan R. Armanie, undergraduate researcher, Summer 2015, CERI-REU.

Service

College, Campus, and University

Panelist, Mentor Panel on undergraduate research, Penn State, 2021.

Member, Faculty awards committee, Penn State Brandywine, 2021.

Judge, Undergraduate exhibition, Penn State, 2020.

Member, IST program course committee member, 2020–present.

Member, STEM options committee, Penn State Brandywine, 2020–present.

Member/co-chair, Undergraduate research committee, Penn State Brandywine, 2016, 2018–present.
Member/co-chair, Technology Advisory Committee, Penn State Brandywine, 2015–present.
Member, Teaching excellence committee, Penn State Brandywine, 2017–2018.
Member, Sustainability committee, Penn State Brandywine, 2017–2018.
Member, Engineering faculty search committee, Penn State Brandywine, 2017–2018.
Member, IST faculty search committee, Penn State Brandywine, 2016–2017.
Member, Global cyber learning factory, Computer Science and Engineering, Penn State, 2012–2013.
Academic advisor, Engineering advising center, Penn State, 2010.
Member, Student technology advisory committee: Instructional Systems, Penn State, 2004–2005.

External Committee Work

Activity chair, IEEE WIE Philadelphia, March 2023–March 2024.
Review panel member, CTE 2020 International Teaching Forum. November 2019–August 2020.
Program committee member, International Conference of Innovative Technologies and Learning. March–August 2020.
Program committee member, 24th Global Chinese Conference on Computers in Education. September 2019–September 2020.
Deacon, West Chester Community Christian Church, 2017–2019.

Webmaster, State College Chinese Alliance Church, 2013–2015.
Deacon, State College Chinese Alliance Church, 2005–2015.
Member, Association for Educational Communication and Technology (AECT) Website design taskforce, 2004.
Webmaster, Taiwanese Student Association, Penn State, 2002–2008.

Grant and Journal Reviewer

National Science Foundation (STEM-C Partnerships, Secure and Trustworthy Cyberspace).
ACM Transactions on Computing Education, since 2019.
Entertainment Computing, since 2018.
IEEE Transactions on Education, since 2017.
Computers & Education, since 2010.
Computational and Mathematical Organization Theory, since 2010.
International Journal of Human-Computer Interaction, since 2009.
Journal of Educational Computing Research, since 2009.

Other Activities

Software Projects

D2P2: Declarative to Procedure (version 2): A general purpose, computer-based tutoring system for training and skill acquisition. Created with the supported by ONR.
<http://acs.ist.psu.edu/d2p2>
Social Performance Optimization Tool (SPOT): A web application for visualizing learners' performance to motivate learner interaction and enhance the sense of social presence.

Two-minute STEM Drill: A mobile learning system for middle school students in STEM subjects.

Caffeine Zone: An iPhone application that monitors and teaches caffeine consumption.

(Available on the iTunes Store and explained at <http://caffeinezone.net>; more than 100k downloads; reported by many media such as *BusinessWeek*, *Self*, *Health*, *ScienceDaily*, *Brisbane Times*, *Congressional Quarterly*, *Appisaurus*, *The Oprah*.)

IQs: An intelligent quiz system that facilitates learning through mobile devices.

Professional Affiliations

Institute of Electrical and Electronics Engineers (IEEE), 2014–present.

Association for Computing Machinery (ACM), 2017–present.