

## CURRICULUM VITAE

### KIRSTEN R. BUTCHER

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#### EDUCATION

- Ph.D., Cognitive Psychology & Cognitive Science** 1999 - 2003  
**University of Colorado at Boulder**  
Department of Psychology and Institute of Cognitive Science  
Advisor: Walter Kintsch
- M.A., Cognitive Psychology** 1997 - 1999  
**University of Colorado at Boulder**  
Department of Psychology and Institute of Cognitive Science  
Advisor: Walter Kintsch
- B.A., Psychology, *summa cum laude*** 1993 - 1997  
**Whitman College, Walla Walla, Washington**

#### ACADEMIC POSITIONS

- Associate Professor, Department of Educational Psychology, University of Utah** 2014 - present  
Programs: Instructional Design & Educational Technology, Learning Sciences
- Director, Instructional Design and Educational Technology (IDET) Program** 2014 - present  
Department of Educational Psychology, College of Education, University of Utah
- Director, Center for the Advancement of Technology in Education (CATE)** 2012 - present  
College of Education, University of Utah
- Assistant Professor, Department of Educational Psychology, University of Utah** 2008 - 2014  
Programs: Instructional Design & Educational Technology, Learning Sciences
- Postdoctoral Research Fellow, Learning & Cognition/Educational Technology** 2005-2008  
**University of Pittsburgh**  
Learning Research & Development Center (LRDC); Pittsburgh Science of Learning Center. Mentors: Michelene T.H. Chi (University of Pittsburgh), Vincent Aleven (Carnegie Mellon)
- Postdoctoral Fellow, Science Visualization and Digital Library Research** 2003 - 2005  
**University Corporation for Atmospheric Research (UCAR)**  
**& the National Center for Atmospheric Research (NCAR)**  
Digital Library for Earth Systems Education (UCAR) & Visualization and Enabling Technologies Section (NCAR). Mentors: Mary Marlino, Tamara Sumner (CU Boulder), Don Middleton, Tim Scheitlin

#### INDUSTRY EXPERIENCE

- Human Factors and User Experience Researcher, Lextant Corporation, Boulder, CO. 2001
- Design and Usability Group: Researcher, US West Advanced Technologies, Boulder, CO. 2000

#### RESEARCH INTERESTS

- Comprehension and Learning  
Visual Representations, Multimedia, and Cyberlearning

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Design, Development, and Assessment of Educational Technology  
Complex Cognitive Processes: inference, integration, transfer, mental model development  
Human Computer Interaction and User Experience Design

### GRANTS

#### FUNDED GRANTS: NATIONAL FUNDING AGENCIES/CENTERS

- PI: **Kirsten Butcher**, co-PIs: Mitchell Power and Madlyn Runburg. *National Science Foundation: Discovery Research PreK-12 (DRK-12)*. EPIC Bioscience: A Practice-Based Online Learning Environment for Scientific Inquiry with Digitized Museum Collections in Middle School Classrooms. **\$1,313,939**. 2018-2022
- PI: David Johnson, Co-PI: **Kirsten R. Butcher**. *NSF IIS: Cyberlearning: Transforming Education*. Award #IIS-1217301. EXP: Deepening Conceptual Understanding with Hands-on, Augmented-Reality Experimentation. **\$524,051**. 2012-2016
- PI: **Kirsten R. Butcher**. *NSF DUE: National STEM Education Distributed Learning (NSDL)*. Award # DUE-1043717. Collaborative Project: Understanding Impact: A Scaling and Replication Study of the Curriculum Customization Service. **\$47,001**. 2010-2012
- PI: **Kirsten R. Butcher**. Co-PIs: Anne Cook, Robert Zheng. *NSF DUE: National STEM Education Distributed Learning (NSDL)*. Award # DUE-0938041. Is there an educational advantage to NSDL? Assessing impact on cognitive processes and learning outcomes during resource selection and use. **\$328,905**. 2009-2013
- PI: **Kirsten R. Butcher**. *NSF DRL, Research and Evaluation on Education in Science and Engineering (REESE)*. Award # DRL-0835454. Collaborative Research: Enabling Robust Learning with Conceptual Personalization Technologies. **\$145,558**. 2009-2014
- PI: Vincent Aleven, Co-PIs: Ryan Baker, **Kirsten Butcher**, Hao Cen, Ron Salden. *Pittsburgh Science of Learning Center (NSF SBE-0354420)*: Geometry greatest hits: Optimizing student learning through synergistic techniques. **\$101, 861**. (University of Utah portion: \$33,538). 2009 - 2010
- PI: **Kirsten Butcher**, Co-PI: Vincent Aleven. *Pittsburgh Science of Learning Center (NSF SBE-0354420)*: Visual feature focus in geometry: Instructional support for visual coordination during learning. **\$133,553**. 2007 - 2008
- PI: Tamara Sumner, Co-PIs: James Martin, Mary Marlino, **Kirsten Butcher**. *NSF IIS, Advanced Learning Technologies*. Award # IIS-0537194: Supporting Science Understanding through a Customized Learning Service for Concept Knowledge. **\$504,815**. 2005 - 2008
- PI: Mary Marlino, Co-PI: **Kirsten Butcher**. *NSF IIS, Information Integration*. Award # IIS-0534515: Collaborative Research: Developing a Computational Model of "Quality" for Educational Digital Libraries. **\$144,811**. 2006 - 2008
- PI: Vincent Aleven, Co-PI: **Kirsten Butcher**. *Pittsburgh Science of Learning Center (NSF SBE-0354420)*: Robust learning in visual/verbal problem solving: Contiguity, integrated hints, and elaborated explanations. **\$294,304**. 2005 - 2007

#### FUNDED GRANTS: FOUNDATIONS

- PI: **Kirsten Butcher**. eScience Workspace (technology-supported physical science and engineering instruction). Castle Foundation. **\$4,500** 2016
- College of Education lead: Kirsten R. Butcher. Collaborative work with the Natural History Museum of Utah. *Advancing Critical Thinking: Developing an Innovative Approach to* 2013 - 2018

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*Enhancing Critical Thinking Skills in Young People*. Funding: Joseph and Evelyn Rosenblatt Charitable Fund and the IJ and Jeanné Wagner Foundation. Approximate subcontract funding to date: \$109,577.

### FUNDED GRANTS: STATE AND UNIVERSITY

- PI: **Kirsten Butcher**. *University of Utah, College of Education Faculty Research Incentive Seed Grant*. Personalized STEM Learning with Virtual Reality and 3D Prints. **\$9,977**. 2019
- PI: Robert Zheng, Co-PIs: **Kirsten Butcher**, Paul Gore, A.J. Metz. *Utah System of Higher Education (USHE)*. Evaluation of UtahFutures.org. **\$50,000**. 2011
- PI: **Kirsten R. Butcher**, Co-PI: Robert Zheng. *University of Utah, College of Education Proposal Development Grants*. Using Interactive Multimedia to Develop Robust Scientific Thinking Skills. **\$3,875**. 2011
- PI: **Kirsten R. Butcher**. *University of Utah, University Research Council*. Learning with Interactive Educational Technology: New Methods for Self-Explanation? **\$5,950**. 2009 - 2010
- Subcontracts*
- Researcher: **Kirsten Butcher**. *Subcontract to Arizona State University*. Title: Learning with Visualizations: Engineering Education. **\$67,276**. 2010 - 2012
- Researcher: **Kirsten Butcher**. *Subcontract to Cornell University*. Title: Preserving and Enhancing NSF's Investment in NSDL. **\$49,999**. 2010 - 2011
- PI: Robert Zheng. Co-PI. **Kirsten R. Butcher**. *Subcontract to Utah Education Network*. Evaluation of the NetSafe Project. **\$29,750**. 2009 - 2011
- Researcher: **Kirsten Butcher**. *Subcontract to Cornell University*. Title: NSDL Technical Network Services: A cyberinfrastructure platform for STEM education. **\$74,944**. 2009 - 2010

### ACADEMIC HONORS, AWARDS, AND NOMINATIONS

- University of Utah, College of Education Research Award Spring 2019
- University of Utah Faculty Fellow Award Fall 2017
- University of Utah Presidential Scholar Award 2015-2018
- Best of NMC Award: New Media Consortium. Co-author Madlyn Runburg. Presentation: *Leveraging 3D technologies for learning* 2015
- Outstanding Volunteer Award, Utah FIRST LEGO League 2014
- Nominated for University of Utah, College of Education Research Award 2013
- Nominated for University of Utah, College of Education Teaching Award 2012
- Advanced Study Program Fellowship, National Center for Atmospheric Research 2003
- Psychology Department Service Award, University of Colorado, Boulder 2000
- Institute of Cognitive Science Travel Grant, University of Colorado, Boulder 1999
- Phi Beta Kappa, Whitman College 1997
- Outstanding Psychology Graduate Award, Whitman College. 1997

### PUBLICATIONS

#### IN PREPARATION

- Butcher, K.R.**, Hudson, M., Orr, M., Larson, M., & Lane, M. (in preparation). A framework for evaluating students' critical thinking processes during phenomena-based investigations.

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**Butcher, K.R.**, Hudson, M., Larson, M., & Lane, M. (in preparation). Using digitized fossils to promote middle school students' critical thinking and engagement during a phenomena-based, online investigation.

**Butcher, K.R.**, Son, S. C., & Liang, L.A. (in preparation). Children's interactions with storybook apps: What do students select?

### UNDER REVIEW

**Butcher, K.R.**, Power, M., Larson, M., Velásquez-Franco, S., Orr, M., Bailey, V., & Hudson, M. (resubmitted). Museum leadership for engaging, equitable education: The transformative potential of digitized objects for authentic science experiences. *Curator: The Museum Journal*.

### PEER-REVIEWED PUBLICATIONS

#### JOURNAL ARTICLES

\*Asterisk indicates student co-authors

Son, S. C., **Butcher, K.R.**, & Liang, L.A. (2020). The influence of interactive features in storybook apps on children's reading comprehension and story enjoyment. *The Elementary School Journal*, 120 (3). DOI: 10.1086/707009

Poitras, E., **Butcher, K. R.**, Orr, M.\*, Hudson, M. A.\*, & Larson, M. (2019). Predicting student understanding by modeling interactive exploration of evidence during an online science investigation. *Journal of Interactive Learning Environments*. DOI: 10.1080/10494820.2019.1689146

**Butcher, K. R.**, Runburg-Larson, M., & Lane, M. (2019). Making critical thinking visible for student analysis and reflection: Using structured documentation to enhance effective reasoning and communication. *Science Scope*, 42(8), 44-53.

**Butcher, K. R.**, Runburg, M., & Hudson, M.\* (2017). Using digitized objects to promote critical thinking and engagement in classrooms. *Library High Tech News*, 34(7), 12-15.

**Butcher, K. R.**, Leary, H., Foster, J.\* & Devaul, H. (2014). Facilitating teachers' thinking about pedagogy and technology with an online curriculum planning tool. *Journal of Technology and Teacher Education*, 22(4), 423-447.

Johnson, A. M., **Butcher, K. R.**, Ozogul, G., & Reisslein, M. (2014). Introductory circuit analysis learning from abstract and contextualized circuit representations: Effects of diagram labels. *IEEE Transactions on Education*, 57 (3), 160-168.

**Butcher, K. R.**, Alevan, V. (2013). Using student interactions to foster rule-diagram mapping during problem solving in an intelligent tutoring system. *Journal of Educational Psychology*, 105(4), 988-1009.

Wetzler, P.\*, Bethard, S.\*, Leary, H., **Butcher, K.**, Bahreini, S. D.\*, Zhao, J., Martin, J., & Sumner, T. (2013). Characterizing and predicting the multi-faceted nature of quality in educational web resources. *Transactions on Interactive Intelligent Systems*, 3(3), Article 15 (15:1-15:25).

Johnson, A. M., **Butcher, K. R.**, Ozogul, G., & Reisslein, M. (2013). Learning from abstract and contextualized representations: The effect of verbal guidance. *Computers in Human Behavior*, 29(6), 2239-2247.

Ferrara, L.\*, & **Butcher, K. R.** (2012). Understanding Feedback: Exploring Students' Perceived Needs and Ideas about Feedback in Online Learning Environments. *International Journal on Cyber Behavior, Learning, and Psychology*, 2(2), 48-70.

**Butcher, K. R.**, & Sumner, T. (2011a). How does prior knowledge impact students' online learning behaviors? *International Journal on Cyber Behavior, Learning, and Psychology*, 1 (4), 1-18.

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- Butcher, K. R.,** & Sumner, T. (2011b). Self-directed learning and the sensemaking paradox. *Human Computer Interaction*, 26(1), 123-159. doi: <http://dx.doi.org/10.1080/07370024.2011.556552>.
- de la Chica, S.\*, Ahmad, F.\*, Sumner, T., Martin, J. H., & **Butcher, K.** (2008). Computational Foundations for Personalizing Instruction with Digital Libraries. *International Journal on Digital Libraries*, 9, 3-18.
- Caillies, S., & **Butcher, K. R.** (2007). Comprehension of idiomatic expressions: Evidence for a new hybrid view. *Metaphor and Symbol*, 22, 79-108.
- Butcher, K. R.,** Bhushan, S.\*, & Sumner, T. (2006). Multimedia displays for conceptual search processes: Information seeking with strand maps. *ACM Multimedia Systems Journal*, 11, 236-248.
- Butcher, K. R.** (2006). Learning From Text With Diagrams: Promoting Mental Model Development and Inference Generation. *Journal of Educational Psychology*, 98, 182-197.
- Butcher, K. R.,** & Kintsch, W. (2001). Support of content and rhetorical processes of writing: Effects on the writing process and written product. *Cognition and Instruction*, 19, 277-322.

### CHAPTERS

- Orr, M.\*, Poitras, E., **Butcher, K.**, (in press). Informal Learning with Mixed Reality Environments: Current Trends in Museums, Heritage, and Tourism. In V. Geroimenko (Ed.), *Augmented reality in tourism, museums, and heritage*. Springer (expected 2021).
- Poitras, E., **Butcher, K.**, Orr, M.\* (2020). Modeling interactive behaviors while learning with digitized objects in virtual reality environments. In Zheng, R. (ed.), *Cognitive and affective perspectives on immersive technology*. IGI Global.
- Butcher, K.R.,** Hudson, M.\*, Runburg, M. (2018). Visualizations for deep learning: Using 3D models to promote scientific observation and reasoning during collaborative STEM inquiry. In Zheng, R., (ed.) *Strategies for deep learning with digital technology: Theories and practices in education* (pp. 111-135). Hauppauge, NY: Nova Science Publishers.
- Butcher, K.R.,** Runburg, M., Altizer, R. (2017). Dino Lab: Designing and developing an educational game for critical thinking. In Zheng, R., & Gardner, M. (eds.) *Handbook of research on serious games for educational applications* (pp. 115 – 148). IGI Global.
- Butcher, K.R.,** & Jameson, J. M. (2016). Computer-based instruction (CBI) within special education. In J. K. Luiselli and A. J. Fischer (Eds.), *Computer-Assisted and Web-Based Innovations in Psychology, Special Education, and Health* (pp. 211 – 254). San Diego: Academic Press.
- Butcher, K.R.,** & Davies, S.\* (2015). Inference generation during online study and multimedia learning. In E.J. O'Brien, A.E. Cook, & R.F. Lorch (Eds.), *Inferences during Reading* (pp. 321 – 347). New York: Cambridge University Press.
- Butcher, K.R.** (2014). The multimedia principle. In R. E. Mayer (Ed.), *The Cambridge Handbook of Multimedia Learning*, 2<sup>nd</sup> Edition (pp. 174-205). New York: Cambridge University Press.
- Butcher, K.R.,** & Kintsch, W. (2012). Text comprehension and discourse processing. In A. F. Healy & R. W. Proctor (Eds.), *Experimental Psychology*. Volume 4 in I. B. Weiner (Editor-in-Chief) *Handbook of psychology*, 2<sup>nd</sup> Edition (pp. 578-604). New York: Wiley.
- Butcher, K.R.,** & de la Chica, S.\* (2010). Supporting Student Learning with Adaptive Technology: Personalized Conceptual Assessment and Remediation. In M. Banich & D. Caccamise (Eds.), *Generalization of Knowledge: Multidisciplinary Perspectives* (pp. 297-330). Taylor & Francis.
- Butcher, K.R.,** de la Chica, S.\*, Ahmad, F.\*, Gu, Q.\*, Sumner, T., & Martin, J. (2008). Conceptual Customization for Learning with Multimedia: Developing Individual Instructional Experiences to

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Support Science Understanding. In R. Zheng (Ed.), *Cognitive effects of multimedia learning* (pp. 260 – 287). Hershey, PA: IGI Global.

**Butcher, K. R.**, & Kintsch, W. (2003). Text Comprehension and Discourse Processing. In A. F. Healy & R. W. Proctor (Eds.), *Experimental Psychology* (pp. 575-595). Volume 4 in I. B. Weiner (Editor-in-Chief) *Handbook of psychology*. New York: Wiley.

### CONFERENCE PROCEEDINGS

Orr, M.\* & **Butcher, K.** (2020). Can Instructional Prompts Support Effective Learner Behaviors with Tangible and Digital 3D Models? In Gresalfi, M. and Horn, I. S. (Eds.), *The Interdisciplinarity of the Learning Sciences, 14th International Conference of the Learning Sciences (ICLS) 2020, Volume 2* (pp. 839-840). Nashville, Tennessee: International Society of the Learning Sciences.

Jensen, M.\*, Casucci, T., Runburg, M., **Butcher, K. R.**, Brown, R., & Altizer, R. (2015). Research Quest: Critical thinking through video games and interdisciplinary collaboration. In *Proceedings of the 10<sup>th</sup> International Conference on the Foundations of Digital Games (FDG 2015)*. Available online: [http://www.fdg2015.org/papers/fdg2015\\_extended\\_abstract\\_24.pdf](http://www.fdg2015.org/papers/fdg2015_extended_abstract_24.pdf)

Davies, S.\*, **Butcher, K.**, & Stevens, C.\* (2013). Self-regulated learning with graphical overviews: When spatial information detracts from learning. In M. Knauff, M. Pauen, N. Sebanz, & I. Wachsmuth (Eds.), *Proceedings of the 35<sup>th</sup> Annual Conference of the Cognitive Science Society* (pp. 2136 – 2141). Austin, TX: Cognitive Science Society.

**Butcher, K.**, Ferrara, L.\*, & Devaul, H. (2013). Teachers' use of an online curriculum planning tool: Usage patterns associated with student learning. *Proceedings of EdMedia 2013: World Conference on Educational Media & Technology*. Chesapeake, VA: AACE.

Ozogul, G., Johnson, A. M., & Reisslein, M., & **Butcher, K.** (2012). Representation guidance with abstract and contextualized representation: Effects on engineering learning performance in technology literacy education. *Proceedings of the ASEE Annual Conference, 2012*. Available online: <http://www.asee.org/public/conferences/8/papers/3625/view>

**Butcher, K. R.**, Davies, S.\*, Crockett, A.\*, Dewald, A.\*, & Zheng, R. (2011). Do graphical search interfaces support effective search for and evaluation of digital library resources? *Proceedings of the 11<sup>th</sup> annual international ACM/IEEE-CS Joint Conference on Digital Libraries (JCDL '11)* (pp. 315-324). New York: Association for Computing Machinery.

Ferrara, L.\*, & **Butcher, K. R.** (2011). Visualizing feedback. Using graphical cues to promote self-regulated learning. In L. Carlson, C. Hölscher, & T. Shipley (Eds.), *Proceedings of the 33<sup>rd</sup> Annual Conference of the Cognitive Science Society* (pp. 1880-1885). Austin, TX: Cognitive Science Society.

**Butcher, K. R.** (2010). How diagram interaction supports learning: Evidence from think alouds during intelligent tutoring. In A. Goel, M. Jamnik, & N. H. Narayanan (Eds.), *Diagrammatic Representation and Inference: Lecture Notes in Computer Science, Volume 6170* (pp. 295-297). Berlin/Heidelberg: Springer.

**Butcher, K. R.**, & Aleven, V. A. (2010). Learning during intelligent tutoring: When do integrated visual-verbal representations improve student outcomes? In S. Ohlsson & R. Catrambone (Eds.), *Proceedings of the 32<sup>nd</sup> Annual Conference of the Cognitive Science Society* (pp. 2888 – 2893). Austin, TX: Cognitive Science Society.

**Butcher, K. R.**, Sumner, T., Maull, K.\*, & Okoye, I.\* (2010). Conceptual personalization technology: Promoting effective self-directed, online learning. In V. Aleven, J. Kay & J. Mastow (Eds.), *Lecture Notes in Computer Science 6095: Intelligent Tutoring Systems Conference, 2010, Part II* (pp. 278-280). Berlin: Springer-Verlag.

Sumner, T., **Butcher, K. R.**, & Wetzler, P.\* (2010). Open educational resource assessments (OPERA). In V.

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- Aleven, J. Kay & J. Mastow (Eds.), *Lecture Notes in Computer Science 6095: Intelligent Tutoring Systems Conference, 2010, Part II* (pp. 414-416). Berlin: Springer-Verlag.
- Bethard, S.\*, Wetzler, P.\*, **Butcher, K. R.**, Martin, J. H., Sumner, T. (2009). Automatically characterizing resource quality for educational digital libraries. In *Proceedings of the 9<sup>th</sup> ACM/IEEE Joint Conference on Digital Libraries, JCDL '09* (pp. 221-230). \*\*\*Winner: *JCDL 2009 Vannevar Bush Best Paper Award*\*\*\*
- Wetzler, P.\*, Bethard, S.\*, **Butcher, K.**, Martin, J. H., & Sumner, T. (2009). Automatically assessing resource quality for educational digital libraries. In *Proceedings of the 3<sup>rd</sup> ACM Workshop on Information Credibility on the Web: WICOW '09I* (pp. 3-10). Madrid: ACM Press.
- Gu, Q.\*, de la Chica, S.\*, Ahmad, F.\*, Khan, H.\*, Sumner, T., Martin, J.H., & **Butcher, K.** (2008). Personalizing the selection of digital library resources to support intentional learning. In B. Christensen-Dalsgaard et al. (Eds.), *ECDL 2008, Lecture Notes in Computer Science 5173: Research and Advanced Technology for Digital Libraries* (pp. 244-255). Berlin: Springer-Verlag.
- Butcher, K.R.**, & Aleven, V. A. (2008). Diagram Interaction during Intelligent Tutoring in Geometry: Support for Knowledge Retention and Deep Understanding. In B. C. Love, K. McRae, & V. M. Sloutsky (Eds.), *Proceedings of the 30<sup>th</sup> Annual Conference of the Cognitive Science Society* (pp. 1736-1741). Austin, TX: Cognitive Science Society.
- Butcher, K.**, & Aleven, V. (2007). Integrating visual and verbal knowledge during classroom learning with computer tutors. In D.S. McNamara & J.G. Trafton (Eds.), *Proceedings of the 29<sup>th</sup> Annual Cognitive Science Society* (pp. 137-142). Austin, TX: Cognitive Science Society.
- Ahmad, F.\*, de la Chica, S.\*, **Butcher, K.**, Sumner, T. R., & Martin, J. H. (2007). Towards Automatic Conceptual Personalization Tools. In E. Rasmussen, R. Larson, E. Toms, & S. Sugimoto (Eds.), *ACM/IEEE Joint Conference on Digital Libraries, JCDL '07*. (pp. 452 – 461). Vancouver, BC: ACM Press
- Butcher, K. R.**, & Bhushan, S.\* (2005). Using strand maps to engage digital library users with science content. *Proceedings of the 5<sup>th</sup> ACM/IEEE-CS joint conference on digital libraries*, p. 371. New York: Association for Computing Machinery.
- Butcher, K. R.**, & Kintsch, W. (2004). Learning with diagrams: Effects on inferences and the integration of information. In A. Blackwell, K. Marriott, & A. Shimojima (Eds.), *Lecture notes in artificial intelligence 2980: Diagrammatic representation and inference* (pp. 337-340). New York: Springer.

### OTHER PUBLICATIONS

- Butcher, K. R.** (2003). Cognitive approaches to assessing the impact of digital libraries. Available online: [http://eduimpact.comm.nsdlib.org/evalworkshop/\\_butcher.php](http://eduimpact.comm.nsdlib.org/evalworkshop/_butcher.php)
- Sumner, T., Marlino, M., & **Butcher, K.** (2003). Developing a Strategy for Evaluating the Educational Impact of NSDL. Preliminary Report on the NSDL Workshop: Evaluation Educational Impact. October 2-3, 2003: Washington DC. Available online: [http://swiki.dlese.org/nsdl2003/uploads/42/Preliminary\\_Report\\_from\\_the\\_NSDL\\_Workshop.doc](http://swiki.dlese.org/nsdl2003/uploads/42/Preliminary_Report_from_the_NSDL_Workshop.doc)
- Giersch, S., **Butcher, K.**, & Reeves, T. (2003). Annotated Bibliography of Evaluating the Educational Impact of Digital Libraries. Available online: [http://eduimpact.comm.nsdlib.org/evalworkshop/eval\\_ann-bib\\_09-29-03.doc](http://eduimpact.comm.nsdlib.org/evalworkshop/eval_ann-bib_09-29-03.doc)

### PRESENTATIONS

#### CONFERENCE PAPERS (PEER-REVIEWED WITHOUT PROCEEDINGS)

- Butcher, K. R.**, Orr, M.\*, Hudson, M.\*, Larson, M., & Power, M. (2020, April). A cognitive process framework for critical thinking applied to evaluation and design of science investigations. *American*

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- Educational Research Association Annual Meeting (AERA 2020)*. San Francisco, CA. (Conference canceled; Paper available in online repository.)
- Orr, M.\*, **Butcher, K. R.**, Larson, M., & Power, M. (2020, April). Perceptions of Authenticity in 3D Objects for Science Education: Evidence from 3D Prints of Fossils. *American Educational Research Association Annual Meeting (AERA 2020)*. San Francisco, CA. (Conference canceled; Paper available in online repository.)
- Orr, M.\*, Poitras, E., & Butcher, K. R. (2019, April). Evolutionary algorithm of interactive factors in inquiry-based learning. Paper presented at the *American Educational Research Association Annual Meeting (AERA 2019)*. Toronto, CA.
- Poitras, E., **Butcher, K. R.**, Orr, M.\*, & Hudson, M.\* (2019, April). Modeling student interactions with an online map to predict differentiated understanding of scientific observations in an inquiry-based learning environment. Paper presented at the *American Educational Research Association Annual Meeting (AERA 2019)*. Toronto, CA.
- Orr, M.\*, & **Butcher, K. R.** (2019, April). Does physicality impact learner interactions? Evidence from tangible and digital 3D models. Paper presented at the *American Educational Research Association Annual Meeting (AERA 2019)*. Toronto, CA.
- Hudson, M.\*, & **Butcher, K. R.** (2019, April). Supporting scientific thinking in middle school: Impact of expert video models on students' collaborative processing. Paper presented at the *American Educational Research Association Annual Meeting (AERA 2019)*. Toronto, CA.
- Dewald, A.\*, & **Butcher, K. R.**, (2018, April). Do interactive domain overviews promote deep understanding in an ill-structured domain? Paper presented at the *American Educational Research Association Annual Meeting (AERA 2018)*. New York, NY.
- Leary, H., & **Butcher, K. R.** (2018, April). Impact of an ICT planning tool on student-centered technology integration. Paper presented at the *American Educational Research Association Annual Meeting (AERA 2018)*. New York, NY.
- Orr, M.\*, **Butcher, K. R.**, Davies, S. (2018, April). Do erroneous explanations hinder learning? Evidence from physics. Paper presented at the *American Educational Research Association Annual Meeting (AERA 2018)*. New York, NY.
- Poitras, E., **Butcher, K. R.**, Hudson, M.\* (2018, April). Subgroup mining of learning behaviors with interactive diagrams in Research Quest. Paper presented at the *American Educational Research Association Annual Meeting (AERA 2018)*. New York, NY.
- Liang, L. A., Son, S.C., **Butcher, K. R.**, & Nelson, E. T.\* (2018, March). Reviewing storybook apps: A framework for consideration of interactive features. Paper presented at the meeting of the *Georgia Conference on Children's Literature*. Athens, GA.
- Butcher, K. R.**, Hudson, M.\*, & Runburg, M. (2017, April). Critical thinking in the classroom using 3-D models of museum objects. Paper presented at the *American Educational Research Association Annual Meeting (AERA 2017)*. San Antonio, TX.
- Orr, M.\*, **Butcher, K. R.**, & Verma, S. (2017, April). Multimedia materials for patient education increase confidence and explanation quality. Paper presented at the *American Educational Research Association Annual Meeting (AERA 2017)*. San Antonio, TX.
- Poitras, E., **Butcher, K. R.**, & Hudson, M.\* (2017, April). Mining sequential patterns in student collaborative dialogue while learning from Research Quest. Paper presented at the *American Educational Research Association Annual Meeting (AERA 2017)*. San Antonio, TX.



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- Butcher, K. R., & Fazeli, N.\*** (2016, April). Scaffolding video explanation using cueing and comparison. Paper presented at the *American Educational Research Association Annual Meeting (AERA 2016)*. Washington, DC.
- Ferrara, L.\*, & **Butcher, K. R.** (2015, April). Promoting deep learning through use of effective self-regulated learning strategies in online learning. Paper presented at the *American Educational Research Association Annual Meeting (AERA 2015)*. Vancouver, Canada.
- Ferrara, L.\*, & **Butcher, K. R.** (2015, April). Using constructive graphical organizers to improve online self-regulated learning outcomes. Paper presented at the *American Educational Research Association Annual Meeting (AERA 2015)*. Vancouver, Canada.
- Ferrara, L.\*, & **Butcher, K. R.** (2012, April). Can feedback visualization promote metacognitive awareness of revisions? Paper presented at the *American Educational Research Association Annual Meeting (AERA 2012)*. Vancouver, Canada.
- Zheng, R., **Butcher, K. R., & Callister, P.\*** (2011, April). Enhancing collaborative learning outcomes during video instruction: Deep prompts support knowledge retention and transfer. Paper presented at the *American Educational Research Association Annual Meeting (AERA 2011)*. New Orleans, LA.
- Ferrara, L. A.\*, & **Butcher, K. R.,** (2010, May). *Does pretraining format predict learning with educational technology?* Paper presented at the annual meeting of the American Educational Research Association 2010, Denver, CO.
- Butcher, K. R., & Aleven, V. A.** (2009, August). Visual self-explanation during intelligent tutoring? More than attentional focus? Paper presented at the *13<sup>th</sup> biennial conference of the European Association for Research on Learning and Instruction (EARLI)*, Amsterdam, Netherlands.
- Butcher, K. R., & Chi, M. T. H.** (2006, August). *How can diagrams scaffold text comprehension?* Paper presented at the EARLI SIG2 Meeting 2006, University of Nottingham, Nottingham, UK.

### TALKS AND POSTERS

- Son, S. C., **Butcher, K. R., & Liang, L. A.** (submitted; 2021, April 7-9). The impact of using electronic storybooks with story-relevant versus story-irrelevant features among head start children [Poster session]. *Society for Research in Child Development 2021*, Virtual Biennial Meeting.
- Butcher, K. R.,** Larson, M., Power, M., Lane, M., & Hudson, M.\* (2021, July). Using digitized scientific collections to engage students in authentic, object-based science investigations. Workshop accepted for STEM 2021 Virtual Conference, July 5-9, 2021. Online.
- Butcher, K. R.,** Larson, M., Power, M., Bailey, V.\*, Hudson, M.\*, Orr, M.\*, & Velásquez-Franco, S. (2021, July). EPIC Bioscience: An online learning environment for biodiversity investigations using digitized specimens from scientific collections. Poster accepted for STEM 2021 Virtual Conference, July 5-9, 2021. Online.
- Butcher, K. R.,** Larson, M., & Orr, M.\* (2020, November). Authentic inquiry with digitized museum objects. Poster presented at the International Society for Technology in Education Virtual Conference (ISTE 2020), November 29-December 5, 2020. Online.
- Larson, M., **Butcher, K. R., & Orr, M.\*** (2020, May). Leveraging digitized collections for learning: EPIC Bioscience. Poster presented at the American Alliance of Museums Virtual Annual Meeting (AAM 2020). May 17-20, 2020. San Francisco, CA.
- Levitt-Bussian, C. G., Larson, M., **Butcher, K. R., & Lane, M.** (2019, May). Examining critical thinking skills of middle-school age learners with 3D models of museum objects in an inquiry-based learning

## CURRICULUM VITAE

system. Poster presented at the Society for the Preservation of Natural History Collections (SPNHC) Annual Meeting. May 25-31, 2019. Chicago, IL.

- Butcher, K. R.** (2019, March). eScience Workspace. Poster session & playground workshop presented at the annual conference of the Utah Coalition for Educational Technology (UCET 2019). March 5-6, 2019.
- Poitras, E. G., **Butcher, K.**, & Hudson, M.\* (2018, September). Mining sequential patterns in student collaborative dialogue while learning from Research Quest. Poster presented at the 2018 Data Science Day @ University of Utah. Salt Lake City, UT.
- Son, S. C., Liang, L. A., **Butcher, K. R.**, & Poitras, E. (2018, June). The Influence of the Story-Related Interactivity of Storybook Apps on Children's Story Recall: A Preliminary Investigation. Poster presented at the National Research Conference on Early Childhood (NRCEC) 2018. Administration for Children and Families, US Department of Health and Human Services. Arlington, VA.
- Butcher, K. R.** (2018, February). *Online assessments as tools for deep learning*. Talk presented at the ITC eLearning Conference, 2018. February 11-14, 2018, Tucson, AZ.
- Runburg, M., **Butcher, K.R.**, Lane, M. (2017, March). *Integrating real-world science, NGSS three dimensions of learning, and technology to promote critical thinking, collaboration, and communication*. Session presented at National Science Teachers Association Annual Meeting, 2017. March 28 – April 2, Los Angeles, CA.
- Butcher, K. R.** (2017, March). *Robotics for elementary education*. Spotlight talk presented at the annual conference of the Utah Coalition for Educational Technology (UCET 2017). March 16-17, Salt Lake City, UT.
- Liang, L. A., Son, S. C., & **Butcher, K. R.** (2017, March). *Storybook apps for early elementary*. Talk presented at the annual conference of the Utah Coalition for Educational Technology (UCET 2017). March 16-17, Salt Lake City, UT.
- Butcher, K. R.**, Runburg, M., & Lane, M. (2017, March). *NHMU Research Quests: 3D and Inquiry*. Talk presented at the annual conference of the Utah Coalition for Educational Technology (UCET 2017). March 16-17, Salt Lake City, UT.
- Levitt-Bussian, C. G., Runburg, M., **Butcher, K.R.**, Lane, M., Toth, N. (2016, October). *Diverse Approaches to Paleo Outreach Programs: Ideas, Strategies, and Logistics*. Workshop presented at Society of Vertebrate Paleontology Annual Meeting, 2016. October 26-29, Salt Lake City, UT.
- Butcher, K. R.**, (2016, March). *Embedding Effective Questions in Videos*. Presentation at Utah Coalition for Educational Technology Annual Meeting (UCET 2016). March 17-18. Salt Lake City, UT.
- Butcher, K. R.**, & Runburg, M. (2016, March). *Advancing Critical Thinking: Online Inquiry with NHMU Objects*. Presentation at Utah Coalition for Educational Technology Annual Meeting (UCET 2016). March 17-18. Salt Lake City, UT.
- Butcher, K. R.**, (2016, March). *Is a 3D print worth 1000 words?* IGNITE presentation, Utah Coalition for Educational Technology Annual Meeting (UCET 2016). March 17-18. Salt Lake City, UT.
- Butcher, K. R.**, & Davies, S.\* (2016, February). *Using videos of hands-on experiments for distance learning in science*. Presentation at eLearning 2016. February 14-17, Scottsdale, AZ.
- Levitt-Bussian, C. G., Runburg, M., **Butcher, K. R.**, Collins, T., & Hudson, M.\* (2015, October). *Leveraging paleontology research, collections, and 3D technologies to promote critical thinking*. Poster presented at the 75<sup>th</sup> Annual Meeting of the Society of Vertebrate Paleontology. October 14-17, Dallas, TX.
- Hudson, M.\*, Davies, S.\*, **Butcher, K. R.**, & Cook, A. E. (2015, July). *Using essays to evaluate learning: Results from human and computerized scoring approaches*. Poster presented at the 25<sup>th</sup> Annual Meeting of the Society for Text & Discourse. July 6-8, Minneapolis, MN.

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- Butcher, K. R., & Runburg, M.** (2015, June). *Leveraging 3D technologies for learning*. New Media Consortium Summer Conference. June 10-11, Washington, DC.
- \*\*\* **Best of NMC Award (“Best in Show”)**\*\*\*
- Butcher, K. R.** (2015, April). *Using learning theory to write better questions*. Utah Coalition for Educational Technology Annual Meeting (UCET 2015). April 2-3, Herriman, UT.
- Butcher, K. R.** (2015, April). *Tools and apps for assessment*. Utah Coalition for Educational Technology Annual Meeting (UCET 2015). April 2-3, Herriman, UT.
- Dewald, A.\*, & **Butcher, K. R.** (2015, April). *Flipped classrooms: Designing and implementing*. Utah Conference on Educational Technology (UCET) 2015. April 2-3, Herriman, UT.
- Ferrara, L.\*, & **Butcher, K. R.** (2014, April). *Choosing apps for optimal learning*. Utah Coalition for Educational Technology Annual Meeting (UCET 2014). April 3-4, Murray, UT.
- Davies, S.\*, **Butcher, K. R.**, & Cook, A. (2013, August). *Graphical overviews structure online learning: Evidence from eye tracking*. Poster presented at the 35<sup>th</sup> annual meeting of the Cognitive Science Society, Berlin, Germany.
- Butcher, K. R.**, & Ferrara, L.\* (2013, August). *Supporting self-regulated learning in conceptual feedback environments*. Poster presented at the 35<sup>th</sup> annual meeting of the Cognitive Science Society, Berlin, Germany.
- Ferrara, L.\*, & **Butcher, K. R.** (2013, July). *Using graphical organizers to improve self-regulated learning: Constructive activities enhance deep learning with online materials*. Poster presented at the 35<sup>th</sup> annual meeting of the Cognitive Science Society, Berlin, Germany.
- Butcher, K. R.**, Indahl, T.\*, & Devaul, H. (2013, April). *Assessing factual knowledge vs. deep understanding of science concepts using visually-based assessment items?* Poster presented at the annual meeting of the American Educational Research Association 2013, San Francisco, CA.
- Ye, L., Walker, A., Recker, M., Leary, H., Devaul, H., **Butcher, K.**, & Sumner, T. (2013, April). *Integrating Technology, Curriculum, and Online Resources: A Multilevel Model Study of Impacts on Science Teachers and Students*. Poster presented at the annual meeting of the American Educational Research Association 2013, San Francisco, CA.
- Butcher, K. R.** (2013, March). *Using photos and videos for deeper learning*. Talk presented at the Utah Coalition for Educational Technology (UCET 2013), Jordan High School, Sandy, UT.
- Butcher, K. R.** (2012, March). *Visual multimedia for learning: What, when, and how?* Talk presented at the Utah Coalition for Educational Technology (UCET 2012), Jordan High School, Sandy, UT.
- Dewald, A.\*, & **Butcher, K. R.** (2012, March). *Using Google apps to create a deeper learning experience for students*. Talk presented at the Utah Coalition for Educational Technology (UCET 2012), Jordan High School, Sandy, UT.
- Butcher, K. R.**, Davies, S.\*, Crockett, A.\*, Zheng, R., Dewald, A., & Cook, A. (2011, July). *Graphical search interfaces for online information seeking*. Poster presented at the 33<sup>rd</sup> Annual Conference of the Cognitive Science Society. Boston, MA.
- Zheng, R., **Butcher, K. R.**, Gupta, U.\*, & Callister, P.\* (2011, July). *Prompting effective collaboration using deep questions*. Poster presented at the 33<sup>rd</sup> Annual Conference of the Cognitive Science Society. Boston, MA.
- Butcher, K. R.**, Crockett, A.\*, & Davies, S.\* (2011, June). *Representing educational content in digital library resources*. Poster presented at the Joint Conference on Digital Libraries (JCDL 2011). Ottawa, Canada. Published in *Proceedings of the 11th annual international ACM/IEEE-CS joint conference on digital libraries*, doi: <http://dx.doi.org/10.1145/1998076.1998174>

## CURRICULUM VITAE

- Butcher, K.R.,** & Zheng, R. (2011, March). *Using the National Science Digital Library in teacher preparation: Research findings and practical strategies*. Talk presented at the Utah Coalition for Educational Technology Annual Conference (UCET 2011), Jordan High School, Sandy, UT.
- Dewald, A.\*, **Butcher, K.,** & Zheng, R. (2011, March). *Developing interactive multimedia to enhance elementary students' critical thinking in science*. Talk presented at the Utah Coalition for Educational Technology Annual Conference (UCET 2011), Jordan High School, Sandy, UT.
- Zheng, R., **Butcher, K.,** Callister, P.\*, & Gupta, U.\* (2011, March). *Strategies for increasing student learning with online videos: Findings from a NetSafe study*. Talk presented at the Utah Coalition for Educational Technology Annual Conference (UCET 2011), Jordan High School, Sandy, UT.
- Butcher, K.,** Foster, J.\* (2010, November). A cognitive interview protocol for assessing changes in teacher knowledge. Talk presented at the *National Science Digital Library Annual Meeting (NSDL 2010)*. Washington, DC.
- Butcher, K.,** Davies, S.\*, Mazal, A.\*, Dewald, A.\*, Zheng, R., & Cook, A. (2010, November). Helping preservice teachers find and evaluate digital resources for the classroom: Can educational digital libraries help? Talk presented at the *National Science Digital Library Annual Meeting (NSDL 2010)*. Washington, DC.
- Butcher, K. R.,** Zheng, R., Cook, A., Crockett-Mazal, A.\*, & Davies, S.\* (2010, November). *What do preservice teachers find when using NSDL vs. Google: An analysis using the ADMIRE rubric*. Poster presented at the National Science Digital Library Annual Meeting (NSDL 2010). Washington, DC.
- Butcher, K. R.,** Zheng, R., Cook, A., Ferrara, L.\*, Davies, S.\*, Crockett-Mazal, A.\*, & Dewald, A.\* (2010, August). *Facilitating educator evaluation of online instructional materials: Does conceptual browsing impact cognitive processing?* Poster presented at the 32<sup>nd</sup> Annual Conference of the Cognitive Science Society. Portland, OR.
- Butcher, K. R.,** & Sumner, T. (2010, May). *What predicts learning with web resources? Relationships between prior knowledge, approaches to online learning, and learning outcomes*. Poster presented at the annual meeting of the American Educational Research Association 2010, Denver, CO.
- Butcher, K.R.,** Sumner, T., Martin, J., & Devaul, H. (2010, March). *Personalization technology: Supporting cognitive and metacognitive processes during learning*. Poster presented at the REESE annual PI meeting, Washington, DC.
- Sumner, T., Martin, J., **Butcher, K.,** & Devaul, H. (2010, March). *A personalized learning environment*. Poster presented at the REESE annual PI meeting, Washington, DC.
- Butcher, K.R.,** & Zheng, R. (2010, February). *Is there life beyond Google? Using digital libraries to find educational resources for the classroom*. Talk presented at the Utah Coalition for Educational Technology Annual Conference (UCET 2010), Murray High School, Salt Lake City, UT.
- Zheng, R., & **Butcher, K. R.** (2010, February). Design and develop effective learning resources to support K-12 education: A panel discussion. Talk presented at the Utah Coalition for Educational Technology Annual Conference (UCET 2010), Murray High School, Salt Lake City, UT.
- de la Chica, S.\*, Ahmad, F.\*, Gu, Q.\*, Okoye, I.\*, Maull, K.\*, Sumner, T., & **Butcher, K. R.** (2009, June). A personalized learning environment. Poster session presented at the Joint Conference on Digital Libraries (JCDL 2009). Austin, TX. Published in *Proceedings of the 9th annual international ACM/IEEE-CS joint conference on digital libraries*, doi: 10.1145/1555400.1555467
- Butcher, K.R.,** Zheng, R., & Cook, A. (2009, November). Is there an educational impact of NSDL? Studying users' cognitive processes and learning outcomes. Poster session presented at the Annual Meeting of the National Science Digital Library, Washington, DC.

## CURRICULUM VITAE

- Butcher, K.R.** (2008, September). Visual interaction and robust learning. Talk presented at the International Workshop on Spatial Cognition and Learning, University of Freiburg, Freiburg, Germany.
- Butcher, K. R., & Alevan, V. A.** (2008, April). Visual interaction in intelligent tutoring: Support for robust learning. Research presentation for visiting educators and officials from Singapore's Ministry of Education, Carnegie Mellon University, Pittsburgh, PA.
- Butcher, K. R., & Alevan, V. A.** (2008, March). Concept training and deep knowledge assessment: Using CTAT in the classroom. Poster session presented at the Open Learning Interplay Symposium 2008, Carnegie Mellon University, Pittsburgh, PA.
- Butcher, K. R., & Alevan, V. A.** (2008, January). Learning from visual-verbal sources in intelligent tutoring. Paper presented at the Inter-Science of Learning Center Conference (iSLC), Carnegie Mellon University, Pittsburgh, PA.
- Butcher, K. R., & Alevan, V. A.** (2007, October). Visual-verbal coordination: Diagram interaction promotes robust learning in geometry. Poster session presented at the Science of Learning Centers Annual Meeting, Arlington, VA.
- Alevan, V., Evenson, S., & **Butcher, K. R.** (2006, April). *Improved Interaction Design in a Cognitive Tutor for Geometry*. Poster session presented at Carnegie Mellon University's Human-Computer Interaction Institute 12<sup>th</sup> Anniversary Celebration, Pittsburgh, PA.
- Butcher, K. R., & Bhushan, S.\*** (2005, June). *Using Strand Maps to Engage Digital Library Users with Science Content*. Poster session presented at the Joint Conference on Digital Libraries 2005, Denver, CO.
- Butcher, K. R.** (2005, April). *Learning with scientific visualizations: Effects of background knowledge and interactivity*. Poster session presented at the annual meeting of the American Educational Research Association 2005, Montreal, Canada.
- Butcher, K. R., & Kintsch, W.** (2004, March). *Learning with diagrams: Effects on inferences and the integration of information*. Poster session presented at Diagrams 2004, University of Cambridge, Cambridge, UK.
- Butcher, K. R. & Pandya, R.** (2004, February). *Preliminary Data on Student Learning with VGEE (The Visual Geophysical Exploration Environment)*. Poster session presented at the National Science Foundation Cutting Edge Workshop: Teaching Geoscience with Visualizations: Using Images, Animations, and Models Effectively, Carleton College, Northfield, MN.
- Greene, L., Boyko, M., Susnowitz, S., **Butcher, K. R.**, Kintsch, E., & Kintsch, W. (1998, December). *Introducing Science WRITE*. Poster session presented at the International Conference of the Learning Sciences, Atlanta, Georgia.

### INVITED TALKS

- Cognitive Science Society Annual Meeting, Rumelhart Prize Symposium in honor of Michelene Chi. Invited symposium speaker. "Designing learning environments for effective cognitive engagement." CogSci 2019. July 24-27, 2019. Montreal, Canada. 2019
- Visualization in Science and Education (Gordon Research Conference). Invited plenary talk, "From seeing to understanding: The impact of high-level cognitive processes during learning with visualizations." GRC-Viz 2019. July 14-19, 2019. Portland, ME. 2019
- Portland Community College Summit for Faculty Teaching Online. Invited talk and invited workshop: "Quizzes for deep learning." May 3, 2019. Portland, OR. 2019

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Instructional Technology Council Network, Invited eLearning Webinar. (Title: Online Assessments as Tools for Deep Learning). October 23, 2018	2017
Utah Valley University Instructional Design Summit, Keynote talk. (Title: "Designing Digital Assessments for Deep Learning")	2017
Center for Teaching & Learning Excellence, Faculty Boot Camp, University of Utah (Title: "Using HCI & Learning Science to Improve Digital Organization and Online Assessment")	2017
Center for Teaching & Learning Excellence, Graduate Student Teaching Workshop Series, University of Utah (Title: "Learning to Develop Effective Outreach")	2017
Faculty Seminar Series, Molecular Biology Umbrella Program, University of Utah (Title: "Transforming Teaching using Cognitive Science")	2015
Research Administration NAKAMA Series, University of Utah	2013
J. Willard Marriott Library: Information Visualization Lecture Series	2013
POGIL (Process Oriented Guided Inquiry Learning) Southwest Regional Workshop: Plenary speaker	2012
Utah Futures Executive Steering Committee, Utah State Capitol	2011
Utah State University	2010
Brain, Mind, Learning (Scientific Symposium Session): Society for the Advancement of Native Americans & Chicanos in Science (SACNAS)	2008
Indiana University, Bloomington	2007
Kent State University	2007
University of Pittsburgh	2005
Carnegie Mellon University	2005
University of Memphis	2005

### ADVISORY BOARD / EXPERT PANEL MEMBERSHIPS & INVITATIONS

<b>Advisory Board Member.</b> Meta-Analysis to Support an Integrated Theory of Multimedia Learning: An ECR Synthesis Proposal. PI: Jennifer Cromley (University of Illinois at Urbana-Champaign). NSF ECR grant project.	2017 - current
<b>National Advisory Team.</b> Advancing Critical Thinking Project, Natural History Museum of Utah (NHMU).	2013 - current
<b>Advisory Board Member.</b> Improving search, sensemaking, learning, and social tagging through a universal appliance for query expansion and meaningful concept displays. <i>Institute of Museum and Library Services: National Leadership Grant for Libraries</i> . PI: Xia Lin (Drexel University); co-PIs: Dagobert Soergel (University at Buffalo), Murtha Baca (Getty Research Institute), William Yang (ARTstor)	2011 - 2014
<b>Advisory Board Member.</b> Fostering more effective use of the learning progressions in NSDL Science Literacy Maps. <i>NSF DUE # 1043169</i> . PI: Francis Molina (American Association for the Advancement of Science: AAAS); co-PIs: Jo Ellen Roseman (AAAS), Mary Koppal (AAAS)	2011 - 2013
<b>Advisory Board Member.</b> Edited Book: Zheng, R., Hill, R., & Gardner, M. (eds.) (2012). Engaging older adults with modern technology: Internet use and information. Hershey, PA: IGI Global Publisher.	2011

## CURRICULUM VITAE

- External Evaluator.** Robust and efficient learning: Modeling and remediating students' domain knowledge. *NSF, DRL # 0910188*. PI: Albert Corbett (Carnegie Mellon University); co-PIs: Ryan Baker (Worcester Polytechnic Institute), Aaron Mitchell (Carnegie Mellon University) 2010 - 2013
- Advisory Board Invitation.** Design Characteristics of Effective Online Professional Development: Tools to Support the Common Core State Standards for Geometry. PI: Nanette Seago (WestEd). *Grant submitted to the Institute of Education Sciences.* Grant Declined
- Advisory Board Invitation.** Efficacy study on the impact of interactive white board technology. PI: Steve Schneider (WestEd STEM Program). *Grant submitted to the Institute of Education Sciences.* Grant Declined
- Advisory Board Invitation.** Celebrated frogs: Natural science education through the lens of domestic amphibian declines. *Grant submitted to the National Science Foundation: Informal Science Education.* PI: Kenning Arlitsch (University of Utah); co-PIs: Jeff Rice (University of Utah), Laura Hunter (Utah Education Network) Grant Declined
- Advisory Board Invitation.** Fostering pedagogical content knowledge in weather and climate through online professional development. *Grant submitted to the National Science Foundation Discovery Research K-12.* PI: Francis Molina (AAAS); co-PIs: Ted Willard (AAAS), Mary Koppal (AAAS), Robert Steiner (AMNH), Al Byers (NSTA) Grant Declined
- Advisory Board Invitation.** Understanding faculty learning through the NSDL: A case study using 'Teach the Earth.' *Grant submitted to the National Science Foundation: National STEM Distributed Learning.* PI: Cathy Manduca (Carleton College). Grant Declined

### TEACHING EXPERIENCE

- Advanced Instructional Design (EDPS 6431).* Educational Psychology. Undergraduate/Graduate Course. University of Utah. 2014 – current
- Educational Applications of Technology (Grades 6-12): Mathematics (EDPS 5151 / 6151).* Educational Psychology. Undergraduate/Graduate Course. University of Utah. 2014
- Learning with Visual Multimedia and External Representations (EDPS 7851).* Educational Psychology. Graduate Seminar. University of Utah. 2013 - current
- Integrating Technology II: Science (EDPS 5442/6442).* Educational Psychology, Online Undergraduate/Graduate Course. University of Utah. 2010 - 2016
- Human Computer Interaction (EDPS 6440).* Educational Psychology, Graduate Course: Instructional Design & Educational Technology. University of Utah. 2009 - current
- Learning Sciences Seminar (EDPS 7440).* Educational Psychology, Graduate Course: Learning Sciences. University of Utah. 2009 - 2014
- Using Technology in Diverse Classrooms (EDPS 3140/6141), Regular & Honors Sections.* Educational Psychology, Undergraduate/Graduate Course (Required for Pre-service Teachers in Elementary Education). University of Utah. 2008 - current
- Introduction to Web-Based Tools and Applications (EDPS 6447).* Educational Psychology, Graduate Course: Instructional Design & Educational Technology. University of Utah. 2009
- Technology & Cognition: Learning with Multimedia.* Institute of Cognitive Science, Graduate Seminar, Co-taught with Dr. Tamara Sumner (CU Boulder). University of Colorado at Boulder. 2005

## CURRICULUM VITAE

<i>Cognition and Perception Core. Cognitive Psychology, Undergraduate Core Course.</i> University of Colorado at Boulder.	2001
(Teaching Assistant) <i>Psychology of Perception. Cognitive Psychology, Undergraduate Course.</i> University of Colorado at Boulder.	1998
(Teaching Assistant) <i>Introduction to Psychology. Psychology Department, Undergraduate Course.</i> University of Colorado at Boulder.	1997

### EDUCATIONAL TECHNOLOGY CREDENTIALS

<i>Adobe Certified Associate</i>  Visual Design using Adobe Photoshop	2020 -
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### TEACHING INTERESTS

Comprehension, Learning, and Cognition  
Educational Technology, Multimedia, and Instructional Design  
Cyberlearning Tools and Services  
Technology Integration and Online Instruction for Pre-Service and Practicing Teachers

### STUDENT MENTORING

#### PH.D. STUDENTS

Ph.D. Advisor to Matt Orr, Learning Sciences, University of Utah	2015 -
Ph.D. Advisor to Sarah Davies, Learning Sciences, University of Utah	2011 - 2018
Ph.D. Advisor to Aaron Dewald, Learning Sciences, University of Utah	2010 -
Ph.D. Advisor and Dissertation Committee Chair, Lisa Ferrara, Ph.D. Educational Psychology (Learning and Cognition), University of Utah.	2009-2017
Ph.D. Advisor and Dissertation Committee Chair, Man Hung, Ph.D., Educational Psychology (Learning Sciences), University of Utah. Dissertation title: <i>Achieving science, math, and reading literacy for all: The role of inquiry-based science instruction.</i>	2008-2009
Dissertation Committee Member, Kyle Branch, Ph.D. candidate in the Department of Chemical Engineering (College of Engineering)	2016 - 2018
Dissertation Committee Member, Amber Whiteley, Ph.D. candidate in the Department of Educational Psychology (Counseling/Counseling Psychology), University of Utah	2016-
Dissertation Committee Member, Laken Shirley, Ph.D. candidate in the Department of Educational Psychology (Counseling/Counseling Psychology), University of Utah	2015-
Dissertation Committee Member, Melissa Shreve, Ph.D. candidate in the Department of Educational Psychology (Counseling/Counseling Psychology), University of Utah	2014 - 2018
Dissertation Committee Member, B. Brian Kuhlman, Ph.D. candidate in the Department of Educational Psychology (Learning Sciences), University of Utah.	2013 - 2014
Dissertation Committee Member, Sara Owen, Ph.D. candidate in the Department of Educational Psychology (Counseling/Counseling Psychology), University of Utah.	2013 - 2015
Dissertation Committee Member, Timothy Indahl, Ph.D. candidate in the Department of Educational Psychology (Learning Sciences), University of Utah.	2012 - 2015
Dissertation Committee Member, Tiffany Jo Merrill, Ph.D. candidate in Educational Psychology (Counseling/Counseling Psychology), University of Utah.	2009-2013



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Dissertation Committee Member, Whitney Hagen, Ph.D. candidate in Educational Psychology (Counseling/Counseling Psychology), University of Utah.	2011- 2013
Dissertation Committee Member, Pauline Longberg, Ph.D. candidate in Educational Psychology (Reading and Literacy), University of Utah.	2010-2012
Dissertation Committee Member, William Elder, Ph.D. candidate in Educational Psychology (Counseling/Counseling Psychology), University of Utah.	2011-2012
Dissertation Committee Member, Adam Kuban, Ph.D. candidate in the Department of Communications, University of Utah.	2009 - 2012
Dissertation Committee Member, Matthew Keener, Ph.D., Educational Psychology (Learning Sciences), University of Utah.	2008-2011
Dissertation Committee Member, Adrienne Farley Splinter, Ph.D., Educational Psychology (Learning Sciences), University of Utah.	2008-2010
Dissertation Committee Member, Philipp Wetzler, Ph.D., Computer Science & Cognitive Science, University of Colorado at Boulder.	2008-2010
Dissertation Committee Member, Qianyi Gu, Ph.D., Computer Science & Cognitive Science, University of Colorado at Boulder.	2007-2009
Dissertation Committee Member: Sebastian de la Chica, Ph.D., Computer Science & Cognitive Science, University of Colorado at Boulder.	2005-2008
Dissertation Committee Member, Faisal Ahmad, Ph.D., Computer Science & Cognitive Science, University of Colorado at Boulder.	2005-2008

### **M.S., M.STAT, & M.ED. STUDENTS**

Thesis Committee Chair, Matt Orr, M.S. Candidate,, Learning Sciences Program, University of Utah	2018 -
Thesis Committee Chair, Kelly Summers, M.S. Candidate, Instructional Design and Educational Technology, University of Utah.	2013 - 2015
Thesis Committee Chair, Susan Stephenson, M.S., Instructional Design and Educational Technology, University of Utah.	2013 - 2015
Thesis Committee Chair, Corey Stevens, M.S., Instructional Design and Educational Technology, University of Utah.	2012 - 2014
Thesis Committee Chair, Sarah Davies, M.S., Instructional Design and Educational Technology, University of Utah.	2010 - 2012
Thesis Committee Chair, Ashley Crockett, M.S., Instructional Design and Educational Technology, University of Utah.	2010 - 2011
Thesis Committee Chair, Lisa Ferrara, M.S., Instructional Design and Educational Technology, University of Utah.	2008-2009
Thesis Committee Member, Laurel Udy, M.S., Learning Sciences Program, University of Utah	2018-
Thesis Committee Member, Michelle Hudson, M.S., Learning Sciences Program, University of Utah	2014 - 2015
Thesis Committee Member, Wei Wei, Learning Sciences Program, University of Utah.	2014-2017

## CURRICULUM VITAE

- Thesis Committee Member, Natalie Harris, Learning Sciences, University of Utah. 2012-2013
- Thesis Committee Member, Doug Adams, M.Stat, University of Utah. 2008-2010
- Thesis Committee Member: Sonal Bhushan, M.S., Computer Science, University of Colorado. 2004
- Committee Member, Jeff Vanek, JD, Professional Masters' of Science and Technology program. 2010
- Capstone Project Committee Chair: University of Utah, Instructional Design & Educational Technology, M.Ed. students
- 2019-2020: Jami Gardner, Bryan Hull, Autumn Krogh, Peng Lim, and Raymon Naisbitt
- 2018-2019: Ryan Dickison, Charles (Clay) Diffrient, Sophia Gagakuma, Cheryl Lamar, Kyle Whittle
- 2016-2017: Marla Beal, Aubrey Hart, Sasha Land, Athena Nadeau, Corban Remund, Patrick Smith
- 2015-2016: Heather Horseley, Jonathan Lofgren, Teju Shearer-Davis, Andrew Tullis
- 2014-2015: Chad Crawford, Amanda Higgs, Jeffrey Hodson, McKenna Lane, Kimberley Sorenson
- 2013-2014: Hiroyuki Takahashi, Ellesse Sorbonne, Robert Mills, Kelly Summers
- 2012-2013: Adam Schafer, James Fenton, Evan Hanson
- 2011-2012: Rosemary Defa, Lavar Edwards, Sarah Eyring, Aaron Herd
- 2010-2011: Kathy Carter, Ran Chen, Catherine Cooper, Ashley Crockett
- 2009-2010: Aaron Dewald, Richard Finlinson, Brenda Hale
- 2008-2009: Leilani Funaki, Joanna Gibb
- Capstone Project Committee Member: University of Utah, Instructional Design & Educational Technology, M.Ed. students.
- 2018-2019: Kyle Carsey, Elizabeth (Lizz) Corrigan, Maxine Dee, Cassandra Fuentes, Kimberly Hofmann, Steve Langman, Steven Naisbitt, Kyle Poppitz
- 2016 – 2017: Brandon Baird, Ashley Bell, Bryce Bird, Pamela Carpenter, Michael Luthy, Marah Metallo, Tristan Olson, Lindsay Snow, Brady Thompson, Terrell Wyche
- 2015-2016: Erica Ball, Rory Christensen, Jeffrey Honsvick, Cherie Lindhardt, Hailey Richins, Oumar Traore, Chanté Wilson
- 2014-2015: Robin-Elise Call, Neil Carpenter, Dallin Cowles, Justin Hill, Damon Kenrick, Todd Lagerberg, James Morris, Devaki Murch, Sara Schneider, Kareena Steed
- 2013-2014: Matthew Anderson, Ray Balhorn III, Tyler Barry, Daniel Berry, Dustin Christensen, Jason Davenport, Rachel Draper, Kerissa Dunn, LaVar Edwards, Allison Hewett, Joshua Knell, Dianna Lee, Ying Ma, Ashton Smith, Benjamin Smith, Jana Tullis

## CURRICULUM VITAE

2012-2013: Stefani Anderson, Valerie Boyles, Carol Davis, Alison Gallagher, Maggie Hortin, Janae Hunt, Maku Matsumo, Nicole Herrera, , Kelli Page, Morgan Rindlisbacher, Deanna Weierholt, Jennifer Willie

2011-2012: Laura Adams, Matthew Baumann, David Card, Cynthia Carter, Richard Roper, Don Shirts, Jessie Stewart, Anthony Sudweeks, Ammon Wiemers

2010-2011: Jennifer Fayette, Matthew Greenwood, Denice Lingen, Joshua Miller, Carl Montgomery, Kevin Pompei, Elizabeth Sallay

2009-2010: Justin Brooksby, Dominick Bruso, Christine Ramker, Brianne Swanson, Stephan Taeger, Shawn Atwood, David Butler

2008-2009: Kathryn Blunt, Camille Cole, John Dolan, Richard Hoffman, Jennifer Hogle

### OTHER STUDENT ADVISING

University of Utah: College of Education Honors Program. Honors thesis advisor for Parisa Badizadegan	2013-2015
University of Utah: Innovation Scholar Program. Faculty mentor to Madison Gregrich	2013
University of Utah: Innovation Scholar Program. Faculty mentor to Daniel Houston	2013
Research Mentor, Pittsburgh Science of Learning Center Undergraduate Summer Internship Program. Students: Amy Clinch (2006), Alyssa Kaye (2007), Jenna Small (2007)	2006 - 2007
Research Mentor, First Experiences in Research, University of Pittsburgh. Student: Sommer Ebdlahad	2007
Research Supervisor, Undergraduate Research Practicum, University of Pittsburgh. Students: Sommer Lohler (2006), Peter Hung (2007)	2006 - 2007
Scientific writing and communication mentor for SOARS (NCAR's research mentorship program for minority undergraduate/graduate students). Students: Braxton Edwards (2004), Shanna Shaye-Forbes (2005)	2004 - 2005

### SERVICE

#### UNIVERSITY, COLLEGE, & PROGRAM

##### *STANDING COMMITTEES AND GROUPS*

University of Utah, Academic Appeals and Misconduct Committee	2020 - 2023
University of Utah, Academic Senate: College of Education Senator	2018 - 2021
University of Utah, College of Education Scholarship Committee	2018 -
University of Utah, Strategic IT Committee (SITC)	2017, 2018 -
University of Utah, Biodiversity Faculty Cluster	2015 -
University of Utah, College of Education, RPT Committee	2016 - 2017
University of Utah, College of Education, Undergraduate Degree Committee	2016 - 2017
University of Utah, College of Education: Library Representative	2014 - 2015

## CURRICULUM VITAE

University Information Technology (UIT) Teaching and Learning Portfolio Committee, University of Utah	2013-
College of Education Honors Committee, University of Utah	2012-
Innovation Scholar Program, Steering Committee Member, University of Utah	2011 - 2014
Committee for a Technology Enhanced Curriculum, University of Utah	2009 - 2012
Department of Educational Psychology, Learning Sciences Program Committee, University of Utah	2009-
Department of Educational Psychology, Diversity Committee, University of Utah	2009-

### *TASK FORCES, SEARCH COMMITTEES, AD HOC COMMITTEES*

College of Education Associate Dean for Faculty & Student Affairs; Search Committee Member	2020 - 2021
College of Education Dean's Search Committee, Co-Chair	2019 - 2020
University of Utah, Taskforce on Educational Futures and Student Success; Education Delivery Working Group	2019
University of Utah, College of Education & Natural History Museum of Utah. Search Committee: Sustaining Biodiversity Cluster (Four interdisciplinary positions)	2015 - 2020
University of Utah, Department of Educational Psychology, Ad Hoc Art Committee	2016
University of Utah, College of Education: Ad Hoc Committee for Research Excellence	2015
University of Utah, College of Education: Information Technology Manager search committee	2014
University of Utah, College of Education: Mathematics Faculty search committee	2014-2016
University of Utah, Search Committee: Marriott Library Associate Dean for Information Technology services	2014
University of Utah, Student Textbook Savings Committee	2014
University of Utah, Educational Psychology Department, Instructional Design & Educational Technology Program, Search Committee: IDET New Faculty.	2013-2014
University of Utah, Marriott Library Classroom Task Force	2013 - 2014
College of Education, Task Force on Multiple Approaches to Course Instruction, University of Utah	2012 - 2013
Project Administration & Management (PAM) Faculty Advisory Committee, University of Utah	2011
College of Education, Research Action Plan Team, University of Utah	2010 -2011

### *FACULTY MENTORING*

Educational Psychology, Faculty mentor to Dr. Tracy Dobie	2018 -
Educational Psychology, Faculty mentor to Dr. Lauren Barth-Cohen	2016 -
Educational Psychology, Faculty mentor to Dr. Eric Poitras	2014 -

### **PROFESSIONAL SERVICE**

#### *GRANT REVIEW PANELS*

## CURRICULUM VITAE

Principal Member Appointment, Institute of Education Sciences (IES), Basic Processes Standing Peer Review Panel (5-year term)	2020-2025
Institute of Education Sciences (IES), Peer Review Panel	2019-2020
Institute of Education Sciences (IES), Ad Hoc Peer Review Panels	2015, 2016
National Science Foundation, Cyberlearning: Transforming Education	2011, 2013, 2014
National Science Foundation, Ad Hoc Grant Proposal Reviewing	2012
National Science Foundation, National Science Digital Library (NSDL)	2007
National Science Foundation, Advanced Learning Technologies (ALT)	2006

### *JOURNAL SERVICE*

#### *EDITORIAL BOARD MEMBER*

Psychological Science	2020 - present
Journal of Educational Psychology	2012 - 2021

#### *EDITORIAL BOARD, ASSOCIATE EDITOR*

International Journal of Research on Cyber Behavior, Psychology, and Learning	2008- present
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#### *AD HOC REVIEWER*

Applied Cognitive Psychology	2009, 2013 - present
Behavior Research Methods	2011, 2014
Computers and Education	2014 - present
Cognition and Instruction	2011 - present
Computers in Human Behavior	2017 - present
Discourse Processes	2014 - present
Education Research and Reviews	2008
Frontiers in Psychology	2019
Human Computer Interaction (HCI)	2009
IEEE Transactions on Learning Technologies	2016
Instructional Science	2017 - present
International Journal on Digital Libraries	2006
Journal of Computer Assisted Learning	2013
Journal of Computer Assisted Learning	2013
Journal of Educational Psychology	2005, 2008 - 2012
Journal of Educational Data Mining	2010
Journal of Learning Analytics	2015
Learning and Instruction	2010 - present
Metacognition and Learning	2020
PLOS-ONE	2019
Transactions on Computer-Human Interactions (TOCHI)	2005
Asia Pacific Education Review	2011 - 2018

## CURRICULUM VITAE

### *PEER-REVIEWED ACADEMIC CONFERENCES*

American Educational Research Association, 2016 Annual Meeting.	2016
<ul style="list-style-type: none"> <li>• Session Discussant. Paper session: <i>Examining flipped classroom learning environments. (Division C: Learning and Instruction)</i></li> <li>• Session Discussant. Paper session: <i>Technology for improving robotics and mathematics learning in early educational settings. (SIG: Technology, Instruction, Cognition, &amp; Learning)</i></li> </ul>	
American Educational Research Association, 2014 Annual Meeting.	2014
<ul style="list-style-type: none"> <li>• Session Discussant: Paper session: <i>Presence, Interaction, and Engagement in Learning (Instructional Technology SIG)</i></li> <li>• Session Chair: <i>Learning on the Go: Mobile Devices in Education (Division C Learning and Instruction)</i></li> </ul>	
American Educational Research Association, 2013 Annual Meeting. Session Discussant: Paper session: <i>Technology-Mediated Collaborative Inquiry (Division C Learning and Instruction)</i>	2013
American Educational Research Association, 2012 Annual Meeting. Session Chair:	2012
<ul style="list-style-type: none"> <li>• <i>Visual Displays Paper Session (Division C)</i></li> <li>• <i>Issues in Technology, Instruction, Cognition and Learning Roundtable Session (SIG: Technology, Instruction, Cognition and Learning).</i></li> </ul>	
American Educational Research Association (AERA): Proposal Reviewer	2011 - present
Cognitive Science Conference (CogSci): Proposal Reviewer	2006 - present
Computer Human Interaction (CHI) Conference: Proposal Reviewer	2006, 2007

### *PUBLIC SERVICE / COMMUNITY ENGAGEMENT*

Natural History Museum of Utah, Teacher outreach workshop co-presenter: Designing Effective Learning Environments Online, November 14, 2020.	2020
Project Judge: 2016-2017 High School Utah Entrepreneurship Challenge (HS UEC)	2017
Volunteer Expert Session for Brownie Troop #326. Developed and guided 20 girls through a cohesive set of skill-based digital activities to earn their "Computer Expert" badges at the University of Utah.	2017
Participant and Session Leader: Utah Ed Camp. Annual professional development event to facilitate collaboration and knowledge exchange amount Utah teachers and educators. (Sponsored by UCET.)	2014 -
State Judge Advisor (all areas), Utah FIRST LEGO League Robotics State Championship, Salt Lake City, UT	2013-2016
Qualifying Tournament Judge Advisor, Utah FIRST LEGO League (a robotics & science innovation program for 9-14 year olds). Salt Lake Community College qualifying tournament.	2015-2017
Head Judge (Core Values) and Organizing Committee Member, Utah FIRST LEGO League (a robotics & science innovation program for 9-14 year olds)	2011-2012
Utah FIRST LEGO League Robotics State Championship, Project Judge, Salt Lake City, UT	2011

## CURRICULUM VITAE

### *PREVIOUS ACADEMIC INSTITUTIONS*

Co-Coordinator, Pittsburgh Science of Learning Center Postdoctoral SWOT Analysis, University of Pittsburgh	2007
Thompson Guest Lecturer Planning Committee: National Center for Atmospheric Research Advanced Studies Program	2005
Review Committee Member, Scientific Computing Division Strategic Plan, National Center for Atmospheric Research; Boulder, CO	2004
Institute of Cognitive Science, Academic Programs Committee, University of Colorado, Boulder	2001 - 2003
Coordinator, Prospective Graduate Student Weekend, University of Colorado, Boulder	1999
Accreditation Review Committee, Whitman College	1997
College Policy Committee, Whitman College	1996 - 1997