

## Tamara Sumner

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## Background

I lead an interdisciplinary research and development lab that studies how computational tools – combining cognitive science, machine intelligence, and interactive media – can improve teaching practice, learning outcomes and learner engagement. Our research and development team combines expertise in cognitive science, learning sciences, science education, user-centered design and evaluation, software engineering, learning analytics, and machine learning/natural language processing.

I am also a Professor at the University of Colorado, with appointments in the Institute of Cognitive Science and the Department of Computer Science. I am currently serving as the Director of the Institute of Cognitive Science. My research and teaching interests include AI in education, learning analytics, technology-enhanced learning environments, educational digital libraries, scholarly communications, human-centered computing, and interdisciplinary research methods for studying learning and cognition. According to Google Scholar, I have written 230 articles and peer-reviewed publications on these topics.

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## Professional Preparation

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| Dec 1995  | Ph.D. in Computer Science, University of Colorado at Boulder<br>Designers and Their Tools: Computer Support for Domain Construction<br>Advisor: Professor Gerhard Fischer |
| Dec 1992  | M.S. in Computer Science, University of Colorado at Boulder   |
| June 1985 | B.A. in Computer and Information Science, University of California, Santa Cruz  |
| June 1982 | B.S. in Earth Science, University of California, Santa Cruz<br>College Honors   |

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## Appointments

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| 2016 - Present | Director, Institute of Cognitive Science, University of Colorado Boulder  |
| 2016 - Present | Professor, Institute of Cognitive Science and Department of Computer Science,<br>University of Colorado Boulder           |
| 2007 - Present | Co-Director of InquiryHub: a research-practice partnership with Denver Public Schools                                     |
| 2005 - 2016    | Associate Professor, Institute of Cognitive Science and Department of Computer Science,<br>University of Colorado Boulder |

- 2005 - 2016 Executive Director, Digital Learning Sciences, a Joint R&D group between CU and the University Corporation for Atmospheric Research (UCAR), Boulder, CO
- 2001 - 2016 Visiting Scientist, University Corporation for Atmospheric Research (UCAR), Boulder, CO
- 1999 - 2005 Assistant Professor, Institute of Cognitive Science and Department of Computer Science, University of Colorado Boulder
- 1998 Acting Director, Knowledge Media Institute, The Open University, Milton Keynes, UK
- 1996 - 1998 Lecturer, Permanent Post, Knowledge Media Institute, The Open University, Milton Keynes, UK
- 1990 - 1995 Research Assistant, Center for LifeLong Learning and Design, Institute of Cognitive Science and Department of Computer Science, University of Colorado Boulder
- 1984 - 1990 Member Technical Staff, Santa Clara Information Systems Division, Hewlett-Packard, Santa Clara, CA
- 1984 Internship, Sorcim, San Jose, CA
- 1984 Internship, Sierra On-Line, Coarsegold, CA

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## Refereed Journal Articles and Book Chapters

- Chakarov A., Biddy Q., Jacobs J., Penuel W., Recker M., & Sumner T., (In press). Professional development supporting middle school teachers to integrate computational thinking into their science classes. In Mouza, C., Yadav, A., & Leftwich, A. (Eds.). *Preparing Teachers to Teach Computer Science: Models, Practices and Policies*. Charlotte, NC: Information Age Publishing.
- Biddy Q., Chakarov A.G., Bush J., Elliot C.H., Jacobs J., Recker M., Sumner T., and Penuel W., 2021. "A Professional Development Model to Integrate Computational Thinking Into Middle School Science Through Codesigned Storylines" *Contemporary Issues in Technology and Teacher Education* 21 (1), 53-96
- Raza A., Penuel W.R., Jacobs J., Sumner T., 2020. "Supporting equity in schools with visual learning analytics by documenting student experience in the classroom". (J. Barnes-Johnson and J. M. Johnson, Eds.). In M. Schmidt, A. Tawfik, Y. Earnshaw, I. Jahnke (Eds.), *Learner and user experience research : An introduction for the field of learning design technology*
- Penuel W.R., Turner ML, Jacobs J., Van Horne K., Sumner T. 2019. "Developing tasks to assess phenomenon-based science learning: Challenges and lessons learned from building proximal transfer tasks", *Science education* 103 (6), 1367-1395
- Recker M and Sumner T. 2018. "Supporting Teacher Learning through Design, Technology, and Open Educational Resources." in *International Handbook of the Learning Sciences* (Taylor & Francis), Chapter 26, 9 pages.
- Quigley D, McNamara C, Ostwald J, Sumner T. 2017. "Using Learning Analytics to Understand Scientific Modeling in the Classroom." *Frontiers in ICT*. 4 (24) (November 09, 2017).
- Severance S, Penuel WR, Sumner T, Leary H. 2016. "Organizing for Teacher Agency in Curricular Co-Design." *Journal of the Learning Sciences*. 25 (4) (January 01, 2016): 531-564.

- Dibie O and Sumner T. 2016. "Using weak ties to understand the resource usage and sharing patterns of a professional learning community." *Social Network Analysis and Mining*. 6 (1): 27 pages.
- Leary H, Severance S, Penuel WR, Quigley D, Sumner T, Devaul H. 2016. "Designing a Deeply Digital Science Curriculum: Supporting Teacher Learning and Implementation with Organizing Technologies." *Journal of Science Teacher Education*. 27 (1) (February 2016): 61-77.
- Sultan, Arafat Md , Steven Bethard, and Tamara Sumner. 2014. 'Back to Basics for Monolingual Alignment: Exploiting Word Similarity and Contextual Evidence', *Transactions of the Association for Computational Linguistics*, 2: 219-30.
- Wetzler, P., S. Bethard, H. Leary, K. Butcher, S. Danesh, J. Zhao, J. H. Martin, and T. Sumner. 2013. 'Characterizing and Predicting the Multi-faceted Nature of Quality in Educational Web Resources', *ACM Transactions on Interactive Intelligent Systems*, 3: 1-25.
- Mauil, K. , M. G. Saldivar, and T. Sumner. 2012. 'Automated Approaches to Characterizing Educational Digital Library Usage: Linking Computational Methodologies with Qualitative Analyses', *International Journal of Digital Libraries*, 13: 51-64.
- Okoye, I., K. Mauil, J. Foster, and T. Sumner. 2012. 'Educational Recommendation in an Informal Intentional Learning System.' in Olga C. Santos and Jesus G. Boticario (eds.), *Educational Recommender Systems and Technologies: Practices and Challenges* (IGI Global: aDeNu Research Group, Spanish National University for Distance Education (UNED), Spain): 1-23.
- Saldivar, M.G., K. Mauil, B. Kirshner, and T. Sumner. 2012. 'A two-dimensional framework for evaluating teachers' technology adoption.' in M. Orey, S.A. Jones and R.M. Branch (eds.), *Educational Media and Technology Yearbook* (Springer: New York, NY): 49-65.
- Butcher, K., and T. Sumner. 2011a. 'Self-Directed Learning and the Sensemaking Paradox', *Human Computer Interaction*, 26: Pages 123-59.
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- Ahmad, Faisal, T. Sumner, and H. Devaul. 2009. 'New Roles of Digital Libraries.' in Yin-Leng Theng, Schubert Foo, Dion Dion Goh and Jin Cheon Na (eds.), *Handbook of Research on Digital Libraries: Design, Development and Impact* (Information Science Reference; 1 edition (January 30, 2009): Hershey, PA): 520-32.
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- de la Chica, Sebastian, F. Ahmad, T. Sumner, J. Martin, and K. Butcher. 2008. 'Computational foundations for personalizing instruction with digital libraries', *International Journal on Digital Libraries*, 9: 3-18.
- Marlino, Mary , T. Sumner, K. Kelly, and M. Wright. 2008. 'When the Music's Over.' in K. Skinner and M. Halbert (eds.), *Strategies for Sustaining Digital Libraries* (Emory University Digital Library Publications Atlanta, GA Atlanta, GA): 97-111.
- Marlino, Mary, and Tamara Sumner. 2008. 'From the Library to the Laboratory: A New Future for the Science Librarian.' in R. Katz (ed.), *The Tower and The Cloud: Higher Education in the Age of Cloud Computing* (EDUCAUSE: Boulder, CO): 190-97.

- Jessup, E. , and T. Sumner. 2007. 'Reflective Essay on the Replicability and Generalizability of the Technology for Community Course', *Annals of Research on Engineering Education*, 3: 3 pages.
- Wright, Michael, T. Sumner, R. Moore, T. Koch. 2007. 'Connecting digital libraries to eScience: The future of scientific scholarship', *International Journal on Digital Libraries*, 7: 1-4.
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- Gu, Qianyi, Faisal Ahmad, and Tamara Sumner. 2005. 'Resource discovery in distributed digital libraries through visual knowledge navigation', *Journal of Zhejiang University: Science*, 6A: 1306-11.
- Jessup, E. , and T. Sumner. 2005. 'Design-Based Learning and the Participation of Women in IT', *Frontiers: A Journal of Women Studies, Special Issue on Gender and IT*, 26: 141-47.
- Jessup, Elizabeth, Tamara Sumner, and Lecia Barker. 2005. 'Report from the trenches: Implementing curriculum to promote the participation of women in computer science', *Journal of Women and Minorities in Science and Engineering*, 11: 273-94.
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- Coleman, A., and T. Sumner. 2004. 'Digital Libraries and User Needs: Negotiating the Future', *Journal of Digital Information, Special Issue on Digital Libraries and User Needs*, 5, No. 3, Article No. 315: 4 pages.
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- Aivazian, B. L., Ed Geary, Tamara Sumner, Michael Khoo, and S. Ireton. 2003. 'Serving K-12 education with the Digital Water Education Library (DWEL)', *Knowledge Quest*, 31: 21-22.
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- Sumner, T, and M. Stolze. 1997. 'Evolution, not revolution: Participatory design in the toolbelt era.' in M. Kyng and L. Mathiassen (eds.), *Computers and Design in Context* (MIT Press: Cambridge): 1-26.
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- Sumner, T. , and M. Stolze. 1996. 'Integrating working and learning: Two models of computer support', *AI & Society*, 10: 70-78.
- Repenning, A., and T. Sumner. 1995. 'Agentsheets: A medium for creating domain-oriented visual languages', *IEEE Computer (Special Issue on Visual Programming)*, 28: 17-25.
- Stahl, G., T. Sumner, and R. Owen. 1995. 'Share globally, adapt locally: Software assistance to locate and tailor curriculum posted to the Internet', *Computers in Education*, 24: 237-46.
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- Raza A., Penuel W.R. , Jacobs J., Sumner T., (2021) "Making it Culturally Relevant": A Visual Learning Analytics System Supporting Teachers to Reflect on Classroom Equity, In the *Proceedings of the International Society of Learning Sciences (ISLS)*, 8 pages.
- Chakarov, A. G.; Bush, J.; Bidby, Q. L.; Jacobs, J.; Elliott, C. H.; Sumner, T., (2021) "Challenges and Unexpected Affordances of Physical Computing Going Remote", In the *Proceedings of the 2021 ACM Interaction Design and Children, IDC 2021*; 276-282.

- Bhaduri, S., Bidy, Q., Bush, J. B., and Sumner, T. (2021). 3DnST: A Framework Towards Understanding Children's Interaction with Tinkercad and Enhancing Spatial Thinking Skills. In the *Proceedings of the ACM conference on Interaction Design and Children (IDC '21, June 2021)*, pp. 257–267.
- Suresh A., J Jacobs, C Clevenger, V Lai, C Tan, JH Martin, T Sumner, (2021) Using AI to Promote Equitable Classroom Discussions: The TalkMoves Application. In: Roll I., McNamara D., Sosnovsky S., Luckin R., Dimitrova V. (eds) *Artificial Intelligence in Education. AIED 2021. Lecture Notes in Computer Science*, vol 12749. Springer, Cham.
- Gendreau Chakarov, A., Bidy, Q., Jacobs, J., Recker, M., & Sumner, T. (2020). Opening the Black Box: Investigating Student Understanding of Data Displays Using Programmable Sensor Technology. In *Proceedings of the 2020 ACM Conference on International Computing Education Research* (pp. 291-301).
- A Suresh, T Sumner, J Jacobs, B Foland, W Ward (2019), Automating analysis and feedback to improve mathematics teachers' classroom discourse, *Proceedings of the AAAI conference on artificial intelligence 33 (01)*, 9721-9728
- H Hedayati, S Bhaduri, T Sumner, D Szafir, MD Gross (2019), HugBot: A soft robot designed to give human-like hugs, *Proceedings of the 18th ACM International Conference on Interaction Design and Children*, Pages 556–561
- A Gendreau Chakarov, M Recker, J Jacobs, K Van Horne, T Sumner (2018), Designing a middle school science curriculum that integrates computational thinking and sensor technology, *Proceedings of the 50th ACM Technical Symposium on Computer Science Education*, Pages 818–824
- Quigley, D., Ostwald, J. Sumner, T. (2017). "Scientific modeling: using learning analytics to examine student practices and classroom variation, *Proceedings of the Seventh International Learning Analytics & Knowledge Conference (LAK)*, Vancouver, CA, 329-338. [Nominated for Best Paper.](#)
- Quigley, D., Dibie, O., Sultan, M. A., Van Horne, K., Penuel, W. R., Sumner, T., Acholonu, U., & Pinkard, N. (2016). Equity of learning opportunities in the Chicago City of Learning program. In T. Barnes, M. Chi, & M. Feng (Eds.), *Proceedings of the 9th International Conference on Educational Data Mining* (pp. 618-619). International Educational Data Mining Society.
- Penuel WR, Van Horne K, Severance S, Quigley D, Sumner T. 2016. "Students' responses to curricular activities as indicators of coherence in project-based science." *12th International Conference of the Learning Sciences*, June 20, 2016-June 24, 2016. Ed. Looi CK; Polman JL; Cress U; Reimann P, Singapore: International Society of the Learning Sciences, June 27.855-858.
- Bell PA, Severance S, Penuel WR, Sumner T, Mommandi W, Quigley D, Van Horne K, Johnson R, Lakhani H, Davis K. 2016. "Researchers and practitioners co-designing for expansive science learning and educational equity." *12th International Conference of the Learning Sciences*, June 20, 2016-June 24, 2016 .Ed.Looi CK; Polman JL; Cress U; Reimann P, Singapore: International Society of the Learning Sciences, June 24.1128-1135.
- Sultan MA, Boyd-Graber J, Sumner T. 2016. "Bayesian Supervised Domain Adaptation for Short Text Similarity." *Proceedings of the 2016 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies (NAACL '16)*, 2016.927-936.

- Sultan A, Salazar C, Sumner T. 2016. "Fast and Easy Short Answer Grading with High Accuracy." North American Chapter of the Association for Computational Linguistics: Human Language Technologies (NAACL '16), 1070-1075.
- Sultan A, Bethard S, Sumner T. 2016. "DLS@CU at SemEval-2016 Task 1: Supervised Models of Sentence Similarity." Proceedings of the 10th International Workshop on Semantic Evaluation (SemEval '16), 650-655.
- Danesh, S. , T. Sumner, and J. H. Martin. 2015. "SGRank: Combining Statistical and Graphical Methods to Improve the State of the Art in Unsupervised Keyphrase Extraction." In *Fourth Joint Conference on Lexical and Computational Semantics*, Denver, Colorado (June): Association for Computational Linguistics, 117-26.
- Dibie, O. and T. Sumner. 2015. "Using weak ties to understand resource usage behaviors in an online community of educators." In *IEEEACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM)*, Paris, France (August 25-28): IEEE Computer Press, 4.
- Sultan, Md A., S. Bethard, and T. Sumner. 2015a. "DLS@CU: Sentence Similarity from Word Alignment and Semantic Vector Composition." In *9th International Workshop on Semantic Evaluation (SemEval)*, Denver, Colorado (June): Association for Computational Linguistics, 148-53, [Winner of the shared task](#).
- Sultan, Md A., S. Bethard, and T. Sumner. 2015b. "Feature-Rich Two-Stage Logistic Regression for Monolingual Alignment." In *Conference on Empirical Methods in Natural Language Processing (EMNLP)*, Lisbon, Portugal (September): Association for Computational Linguistics, 949-59.
- Sultan, Md A., S. Bethard, and T. Sumner. 2014a. "DLS@CU: Sentence Similarity from Word Alignment." In *Proceedings of the 8th International Workshop on Semantic Evaluation (SemEval 2014)*, Dublin, Ireland, 241-46, [Winner of the shared task](#).
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- Okoye, I., S. Bethard, and T. Sumner. 2013. "Automatic extraction of core learning goals and generation of pedagogical sequences through a collection of digital library resources." In *Proceedings of the 13th ACM/IEEE-CS Joint Conference on Digital Libraries*, Indianapolis, IN (July 22-27): Association for Computing Machinery (ACM) Press, 67-76.
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## Other Publications and Reports

- Gendreau Chakarov, A., Bidy, Q., Jacobs, J., Recker, M., Sumner, T., Bush, J. B. & Hennessy Elliott, C. (2021). Supporting teachers to implement engineering design challenges using sensor technologies in a remote classroom environment. Paper presented at the 2021 *American Society for Engineering Education Annual Conference & Exposition*, Long Beach, California.
- Bhaduri, S., Bidy, Q., Rummel, M., Bush, J., Jacobs, J., Recker, M., Ristvey Jr, J. D., Chakarov, A. G., Elliott, C. H., & Sumner, T. (2021). Integrating Professional Mentorship with a 3D Printing Curriculum to Help Rural Youth Forge STEM Career Connections. Paper presented at the 2021 *American Society for Engineering Education Annual Conference & Exposition*, Long Beach, California.
- Bidy, Q., Chakarov, A., Jacobs, J., Sumner, T., Recker, M., Penuel, W., (2020). Integrating Computational Thinking into Middle School Science through Co-designed Storylines. Research Presentation at ASTE International Conference: *Perfecting Your Vision for Teacher Training*. San Antonio, TX.
- Srinjita Bhaduri, Katie Van Horne, and Tamara Sumner. 2019. Designing an Informal Learning Curriculum to Develop 3D Modeling Knowledge and Improve Spatial Thinking Skills. In *Proceedings of the 2019 CHI Conference Extended Abstracts on Human Factors in Computing Systems*. ACM
- A Suresh, T Sumner, I Huang, J Jacobs, B Foland, W Ward (2018), Using deep learning to automatically detect talk moves in teachers' mathematics lessons, 2018 IEEE International Conference on Big Data (Big Data), 5445-5447.

- S Bhaduri, K Van Horne, T Sumner, R Russell, JD Ristvey (2018), Learning Engineering Practices Through Drones: Iterative design of an informal learning curriculum, Paper presented at International Society of the Learning Sciences.
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- Tamara Sumner, Sarah Giersch, David Fulker, Kaye Howe, Susan Jesuroga, Casey Jones, Carol Terrizzi, and Susan Van Gundy. 2003. "National Science Digital Library Progress Report: Fall 2000 - Summer 2003: Report sponsored by the National Science Foundation." Washington, D.C., 29 pages.
- Wright, Michael, and Tamara Sumner. 2003. "Digital Library for Earth System Education (DLESE) Developers' Workshop 2003: Report sponsored by the National Science Foundation." University Corporation for Atmospheric Research (UCAR), Boulder, CO, 78 pages.
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- Marlino, M. R., T. Sumner, M. Dawe, C. A. Manduca, D. Mogk, and D. Fulker. 2001. "The Digital Library for Earth System Education (DLESE) project: A community governed digital library. Poster presentation." In *5th European Conference on Research and Advanced Technology For Digital Libraries (ECDL 2001)*, Darmstadt, Germany (Sep 5-7): Adjunct Proceedings of European Conference on Digital Libraries (ECDL).

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- Sumner, T., J. Domingue, Z. Zdrahal, A. Millican, and J. Murray. 1999. "Moving from On-the-job Training towards Organisational Learning." In *12th Banff Knowledge Acquisition Workshop*, Banff, Alberta, Canada.
- Sumner, T., S. Yates, S. Buckingham Shum, and J.L. Perrone. 1999. "Managing persistent discourse: Organizational Goals and Digital Texts." In *Hawaii International Conference on System Sciences (HICSS 32), Special Track on Persistent Discourse*, edited by Tom Erikson, Maui, HI (Jan 5-8).
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- Sumner, T., J. Domingue, Z. Zdrahal, M. Hatala, A. Millican, J. Murray, K. Hinkelmann, A. Bernardi, S. Wess, and R. Traphöner. 1998. "Enriching representations of work to support organisational learning." In *1st Interdisciplinary Workshop on Building, Maintaining, and Using Organizational Memories (OM-98). In conjunction with the 13th biennial European Conference on Artificial Intelligence (ECAI -98)*, edited by A. Abecker, S. Decker, N. Matta, F. Maurer and U. Reimer, Brighton, UK: Available at: <http://www.aifb.uni-karlsruhe.de/WBS/ECAI98OM>, 109-27.
- Sumner, T., and J. Taylor. 1997. "Coping with virtuality: Steps toward a personal learning manager." In *UNESCO Workshop on Virtual Learning Environments*, edited by Tim O'Shea, The Open University.
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## Invited Presentations and Panels

- Sumner, T. 2015a. 'Using Machine Intelligence to Enhance Pedagogical Design Capacity', October 14, Invited presentation to the Faculty of Education: Hong Kong University.
- Sumner, T. 2015b. 'Pedagogical Design Capacity in the Age of Peer Production', October 12, Invited presentation to the Faculty of Education: Hong Kong University.
- Sumner, T. 2014. 'In the Age of Collaboration: Using Machine Intelligence to Enhance Pedagogical Designs', Feb 7, Invited presentation at Google: Mountain View, CA.
- Kincaid, P., T. Sumner, and M. Jay. 2012. 'IT & Inquiry: Leading Transformation of Learning', March 6, Panel presentation at the Consortium for School Networking 2012 K-12 Technology Leadership Conference (CoSN 2012): Washington, DC.
- Sumner, T. 2012a. 'When You Reach a Fork in the Road... Change Your Business Model', June 3-6, Panel presentation at Content in Context, Annual Meeting of the Association of Educational Publishers and Association of American Publishers (AAP) School Division: Washington DC.

- Sumner, T. 2012b. 'Inquiry Hub', June 21, Invited presentation to the Seminar Series at the Concord Consortium: Concord, MA.
- Sumner, T. 2012c. 'Inquiry Hub', October 30, Invited presentation to the Info Tech Forum: CU Law School, Boulder, CO.
- Sumner, T., H. Devaul, and H. Leary. 2012. 'Curriculum Customization Service', April 3, Invited presentation to delegates from the RAND Corporation: UCAR, Boulder, CO.
- Sumner, T. 2010a. 'Understanding Impact: Preliminary Results from a District-Wide Field Trial of the NSDL Curriculum Customization Service', March 10, Invited presentation to NSF Seminar Series: National Science Foundation, Arlington, VA.
- Sumner, T. 2010b. 'Putting Your Resources in the Path of the User', October 8, Keynote presentation to the GK-12 Rocky Mountain Regional Conference: Denver, CO.
- Sumner, T. 2010c. 'Case Study: The Curriculum Customization Service', December 14, Invited presentation to the Joint NSF/Dept of Education Workshop on Transitioning Research-Developed Learning Technologies to Broad Use: National Science Foundation, Arlington, VA.
- Sumner, T., K. Maull, M. Recker, B. Shelton, and J. Duffin. 2009. 'Recommender Systems, Contextualization and Personalization in NSDL: Current and Future Research Directions', November 17-19, Panel presentation at the National Science Digital Library Annual Meeting: Washington, DC.
- Sumner, T. 2008a. 'Transforming Digital Content into Learning', June 9 - 11, Panel presentation at the Educause Center for Applied Research Summer Symposium Boulder, CO.
- Sumner, T. 2008b. 'From Cyberinfrastructure to Cyberlearning', December 5, Invited presentation to the National Snow and Ice Data Center Colloquium Series: Boulder, CO.
- Sumner, T. 2008c. 'Extending a Curriculum Customization Service to Support Teacher Professional Learning, Diagnostics Remixing and Creative Commons', September 5, Invited presentation to the Open Educational Resources Program: William and Flora Hewlett Foundation.
- Sumner, T. 2008d. 'Agile Technologies for Personalizing Instruction', October 24, Invited presentation to the London Knowledge Lab: University of London, UK.
- Sumner, T., and D. Krafft. 2008. 'NSDL: An extensible, collaborative, community-based digital library for STEM education', February 4-5, Invited presentation to the Cyberinfrastructure for Education Workshop Series: National Science Foundation, Arlington, VA.
- Sumner, T., and M. Marlino. 2008. 'Visualizing Learning Goals and Personalizing Instruction', January 16, Invited presentation to Advanced Distributed Learning: Washington DC.
- Sumner, T. 2007a. 'Transforming Digital Content into Learning: The Potential and Challenges Facing Educational Digital Libraries', April 24, Invited presentation to the Glasscock Center Digital Humanities Lecture Series: Texas A & M, College Station, TX.
- Sumner, T. 2007b. 'From Libraries to Learning', October 3, Invited presentation to the Information Science Colloquium, Cornell University: Ithaca, NY.
- Sumner, T. 2007c. 'Benchmarks and Standards in the NSDL: Current practices and future possibilities', November 5, Invited presentation to Project 2061 at the American Association for the Advancement of Science: Washington, DC.

- Sumner, T. 2005a. 'From Digital Libraries to Educational Cyberinfrastructure', October 10, Invited presentation to the Cultural Communication and Computing Research Institute: Sheffield Hallam University, UK.
- Sumner, T. 2005b. 'From Digital Libraries to Educational Cyberinfrastructure', October 13, Invited presentation to the Knowledge Media Institute: The Open University, UK.
- Sumner, T. 2005c. 'From Digital Libraries to Educational Cyberinfrastructure', October 18, Invited presentation to UKOLN, the United Kingdom Office for Library and Information Networking: University of Bath, UK.
- Sumner, T., R. Heery, J. Hunter, N. Lossau, and M. Wright. 2005. 'Does eScience need Digital Libraries?', Panel presentation at the European Conference on Digital Libraries (ECDL '05), Sept 18-23: Vienna, Austria.
- Sumner, Tamara. 2005d. 'The NSDL Strand Map Service: A Networked Knowledge Organization and Visualization System for K-12 Education', June 10-11, Invited presentation to the 7th Networked Knowledge Organization Systems Workshop: Denver, CO
- Sumner, T. 2004. 'Cyberinfrastructure and Science Education: Issues and Opportunities', March 13, Atlanta, GA: Invited presentation at e-Learn 2004.
- Sumner, T., and M. Marilino. 2004. 'Demonstrating Education Impact: Challenges in the years ahead', June 7-11, Panel presentation at the 4th ACM/IEEE-CS Joint Conference on Digital Libraries (JCDL 2004): Tucson, AZ.
- Sumner, T. 2003a. 'Strand maps as an interactive interface to digital library resources', February 13-18, Panel presentation at the 2003 Annual Meeting of the American Association for the Advancement of Science (AAAS): Denver, CO.
- Sumner, T. 2003b. 'Digital Libraries and Educational Practice: Challenges to learning from, and contributing to, the research base', August 2, Invited presentation to the DLESE Annual Meeting: University of Colorado, Boulder, CO.
- Sumner, T. . 2003c. 'Theoretical foundations of digital libraries', April 21-25, Panel presentation at the 84th Annual Meeting of the American Educational Research Association (AERA): Chicago, IL.
- Sumner, T., and M. Wright. 2003. 'The National Science Digital Library', October 16, Invited presentation to Project 2061 at the American Association for the Advancement of Science: Washington DC.
- Marilino, M., T. Sumner, and D. Fulker. 2002. 'Educational digital libraries: Building community, building libraries. Panel presentation', June 25-28, Panel presentation at ED-MEDIA 2002 World Conference on Educational Multimedia, Hypermedia, and Telecommunications: Denver, CO.
- Sumner, T. 2002a. 'Towards designing scholarly communities', April 12, Invited presentation to the Colloquium Series at the College of Architecture and Planning: University of Colorado, Boulder, CO.
- Sumner, T. 2002b. 'Anatomy of a Breakthrough', October 21, Invited presentation to the NSDL National Visiting Committee: Washington DC.
- Fulker, D., S. Dawes, L. Kalinichenko, T. Sumner, C. Thanos, and A. Ushakov. 2001. 'Digital library collaborations in a world community', June 24-28, Panel presentation at the 1st ACM/IEEE-CS Joint Conference on Digital Libraries (JCDL 2001): Roanoke, VA.



- Marlino, M, T. Sumner, D. Fulker, C. Manduca, and D. Mogk. 2001. 'The Digital Library for Earth System Education', May 15, Invited presentation at the NSF Brown Bag Series: National Science Foundation, Arlington, VA.
- Sumner, T. 2001a. 'What's holding up the development of geo-referenced digital libraries?', Sept 8-9, Panel presentation at the European Conference on Digital Libraries (ECDL '01): Darmstadt, Germany.
- Sumner, T. 2001b. 'Scaling Up to World Community', June 24 -28, Panel presentation at the ACM/IEEE Joint Conference on Digital Libraries (JCDL '01): Roanoke, VA.
- Sumner, T. 2001c. 'Coming Over The Horizon: Upcoming Technologies of Interest to Education', July 15 - 18, Panel presentation at Project Kaleidoscope Summer Institute: Snowbird, UT.
- Sumner, T. 2001d. 'The Future of Open Source and Open Standards', March 15, Panel presentation at the Forum on Public Values and the Architecture of the Information Age: The Future of Intellectual Property, Privacy, and Open Source: Boulder, CO.
- Sumner, T., J. Fellows, and M. Marlino. 2001. 'The DLESE Program Center: Providing Infrastructure for a Distributed Community Library', December 5, Invited presentation to the Geoscience Directorate: National Science Foundation, Arlington, VA.
- Sumner, T., M. Marlino, C. Manduca, D. Mogk, and D. Fulker. 2001. 'DLESE: A Geoscience Facility', May 15, Invited presentation to the Geoscience Directorate: National Science Foundation, Arlington, VA.
- Sumner, T. 2000a. 'Towards Designing Scholarly Communities ', May 29, Invited presentation at the Regional Cognitive Science Colloquia Series for Southern France: Universite de Provence, France.
- Sumner, T. 2000b. 'The Digital Library for Earth System Education ', July 5, Invited presentation to UKOLN, the United Kingdom Office for Library and Information Networking: University of Bath, UK.
- Sumner, T. 1999a. 'Roundtable: The Next New University', Oct 27-30, Panel presentation at the Conference on New Media in Higher Education and Learning: The Getty Center, Los Angeles, CA.
- Sumner, T. 1999b. 'Tele-education: A Killer Application for the 21st Century?', December 5-9: Invited presentation to IEEE Global Telecommunications Conference, Rio de Janeiro, Brazil
- Sumner, T. 1999c. 'From Documents to Discourse', June 21, Invited keynote presentation to the Symposium on Electronic Publishing, Centre for Instructional Technology Development: University of Toronto at Scarborough, Toronto, Canada.
- Sumner, T. 1999d. 'Our New Publishing Space ', June 20, Invited presentation to the Canadian Library Association Conference: Toronto, Canada.
- Sumner, T. 1998. 'Technology-mediated learning at the OU: Past, Present and Future', July, Invited presentation to the College of Engineering Faculty Summer Workshop: University of Colorado, Boulder CO.
- Sumner, T., and J. Domingue. 1997. 'New Media, New Models of Education', November, Invited presentation to the European Network of Excellence in Computational Logic: Lisbon, Portugal.

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## Current Sponsored Research Projects

### *Principal Investigator*

#### **BIGDATA: IA: Automating Analysis and Feedback to Improve Mathematics Teachers' Classroom Discourse**

Award Number: 1837986; Principal Investigator: Tamara Sumner; Co-Principal Investigator: James Martin, Wayne Ward, Jennifer Jacobs, Chenhao Tan, William Foland; Organization: University of Colorado at Boulder; NSF Organization: IIS Start Date: 10/01/2018; Award Amount: \$1,998,505.00

#### **Collaborative Research: Using a School-Based Sensing Platform and Targeted Teacher Professional Development to Support Computational Thinking Integration and Student Learning**

Award Number:1742053; Principal Investigator: Tamara Sumner; Co-Principal Investigator: William Penuel, Jennifer Jacobs, Brian Huang, Susan Olezene, Jahnell Pereira; Organization: University of Colorado at Boulder; NSF Organization: DRL Start Date:09/01/2017; Award Amount: \$2,123,801.00

#### **Collaborative Research: STEM Career Connections: A Model for Preparing Economically-Disadvantaged Rural Youth for the Future Workforce**

Award Number: 1948709; Principal Investigator: Tamara Sumner; Co-Principal Investigator: Quentin Bidy; Organization: University of Colorado at Boulder; NSF Organization: DRL Start Date: 04/01/2020; Award Amount: \$599,660.00

#### **Developing a Model of Teacher Learning to Support Computationally Rich Communication in Science Classrooms**

Principal Investigator: Tamara Sumner; Co-Principal Investigator: William Penuel, Jennifer Jacobs, Quentin Bidy, Mimi Recker; Organization: University of Colorado at Boulder; James S. McDonnell Foundation; Start Date: 02/01/2020; Award Amount: \$2,500,000.00

### *Co-Principal Investigator*

#### **AI Institute: Institute for Student-AI Teaming**

Award Number: 2019805; Principal Investigator: Sidney D'Mello; Co-Principal Investigator: Martha Palmer, J. Ross Beveridge, Tamara Sumner, Sadhana Puntambekar; Organization: University of Colorado at Boulder; NSF Organization: DRL Start Date: 09/01/2020; Award Amount: \$20,000,000.00

#### **OpenSciEd High School Developers Consortium: Supporting Equity and Building Capacity through Collaborative Science Curriculum Development**

Principal Investigator: William Penuel; Co-Principal Investigator: Tamara Sumner, Kate Henson; University of Colorado at Boulder; NCCI/ Carnegie Foundation; Start Date: 01/01/2021; Award Amount: \$7,000,000.00

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## Completed Sponsored Research Projects

#### **Building Capacity for Using Data on Student Experience as Formative Assessment to Promote Equitable Instruction**

Grant Number:201800077; Principal Investigator: William Penuel; Co-Principal Investigator: Tamara Sumner; Organization: University of Colorado at Boulder; Spencer Foundation Start Date:10/30/2017; Award Amount:\$400,000.00

**EAGER: Smart and Connected Communities: Reducing Friction in the L3 Connects Infrastructure: Embedding a recommender system into mobile apps to support real-time brokering**

Award Number:1637350; Principal Investigator: William Penuel; Co-Principal Investigator: Tamara Sumner, Nichole Pinkard; Organization: University of Colorado at Boulder; NSF Organization: DRL Start Date:09/15/2016; Award Amount:\$189,988.00

**Curriculum Units that Exemplify Three Dimensional Learning and Assessment**

Award Number: 1114.12.2969B; Principal Investigator: William Penuel; Co-Principal Investigator: Tamara Sumner; Organization: University of Colorado at Boulder; Moore Foundation; Start Date: 10/01/2015; Award Amount: \$405,202.00

**Engineering Experiences: Research on Student Competency, Motivation and Persistence in STEM for Underserved Youth**

Award Number: 1510922; Principal Investigator: Tamara Sumner; Co-Principal Investigator: Heather Leary; Organization: University of Colorado at Boulder; NSF Organization: DRL; Start Date: 09/15/2015; Award Amount: \$286,117.00

**Pilot Study: Creating a Special Collection of NSF-Funded Learning Resources to Support Core Ideas in High School Biology**

Award Number: 1555550; Principal Investigator: Mary Marlino; Co-Principal Investigator: Tamara Sumner; Organization: University Corporation For Atmospheric Research; NSF Organization: DUE; Start Date: 09/01/2015; Award Amount: \$299,862.00;

**INDP: Inquiry Hub**

Award Number: 1147590; Principal Investigator: Tamara Sumner; Co-Principal Investigator: Janet Carlson, Pamela Van Scotter, William Penuel, Michael Wright, Patricia Kincaid; Organization: University of Colorado at Boulder; NSF Organization: IIS; Start Date: 10/01/2012; Award Amount: \$1,520,531.00

**Collaborative Research: Overcoming Obstacles to Scaling-Up with a Cyberlearning Professional Development Model**

Award Number: 1118392; Principal Investigator: Tamara Sumner; Co-Principal Investigator: Holly Devaul; Organization: University of Colorado at Boulder; NSF Organization: DRL; Start Date: 09/01/2011; Award Amount: \$849,999.00

**From Learning to Research: Developing Future Earth System Scientists and Professionals**

Award Number: 0929725; Principal Investigator: Julie Malmberg; Co-Principal Investigator: Tamara Sumner, Christopher Hoadley, Michael Odell; Organization: University Corporation For Atmospheric Research; NSF Organization: DRL; Start Date: 08/15/2010; Award Amount: \$1,199,215.00

**Collaborative Project: Understanding Impact: A Scaling and Replication Study of the Curriculum Customization Service**

Award Number: 1043638; Principal Investigator: Tamara Sumner; Organization: University of Colorado at Boulder; NSF Organization: DUE; Start Date: 12/01/2010; Award Amount: \$177,990.00

**Collaborative Research: Enabling Robust Learning with Conceptual Personalization Technologies**

Award Number: 0835393; Principal Investigator: Tamara Sumner; Co-Principal Investigator: James Martin; Organization: University of Colorado at Boulder; NSF Organization: DRL; Start Date: 09/01/2009; Award Amount: \$392,381.00

**NSDL Technical Network Services: A Cyberinfrastructure Platform for STEM Education**

Award Number: 0840744; Principal Investigator: Carl Lagoze; Co-Principal Investigator: Michael Wright, Tamara Sumner; Organization: Cornell University; NSF Organization: DUE; Start Date: 10/01/2008; Award Amount: \$7,848,312.00

**Completing the NSDL Strand Map Service: Content Coverage and NDR Integration**

Award Number: 0734889; Principal Investigator: Michael Wright; Co-Principal Investigator: Tamara Sumner; Organization: University Corporation For Atmospheric Research; NSF Organization: DUE; Start Date: 10/01/2007; Award Amount: \$99,748.00

**DLESE Program Center 2007 Work Plan**

Award Number: 0639539; Principal Investigator: Mary Marlino; Co-Principal Investigator: Michael Wright, Tamara Sumner; Organization: University Corporation For Atmospheric Research; NSF Organization: GEO; Start Date: 11/01/2006; Award Amount: \$997,457.00

**Collaborative Project: The NSDL Curriculum Customization Service**

Award Number: 0734875; Principal Investigator: Tamara Sumner; Organization: University of Colorado at Boulder; NSF Organization: DUE; Start Date: 01/01/2008; Award Amount: \$111,535.00

**SGER: Relevance Models for Digital Repository Management**

Award Number: 0741326; Principal Investigator: James Martin; Co-Principal Investigator: Tamara Sumner; Organization: University of Colorado at Boulder; NSF Organization: IIS; Start Date: 09/15/2007; Award Amount: \$138,213.00

**The DLESE Program Center: Providing Infrastructure for a Distributed Community Library**

Award Number: 0215640; Principal Investigator: Mary Marlino; Co-Principal Investigator: David Fulker, Tamara Sumner; Organization: University Corporation For Atmospheric Research; NSF Organization: GEO; Start Date: 09/15/2002; Award Amount: \$11,390,111.00

**Collaborative Project: Core Integration - Leading NSDL toward Long-Term Success**

Award Number: 0227656; Principal Investigator: David Fulker; Co-Principal Investigator: Terence Smith, Mary Marlino, Tamara Sumner, Ellen Hoffman; Organization: University Corporation For Atmospheric Research; NSF Organization: DUE; Start Date: 01/01/2003; Award Amount: \$3,002,048.00

**Collaborative Project: Core Integration - Leading NSDL Toward Long-Term Success**

Award Number: 0424671; Principal Investigator: Kaye Howe; Co-Principal Investigator: Terence Smith, Mary Marlino, Tamara Sumner, Ellen Hoffman; Organization: University Corporation For Atmospheric Research; NSF Organization: DUE; Start Date: 01/01/2004; Award Amount: \$13,311,050.00

**Water in the Earth System (WES): An NSDL K-12 Collection Project**

Award Number: 0121724; Principal Investigator: Edward Geary; Co-Principal Investigator: Shirley Ireton, Bryan Aivazian, Tamara Sumner; Organization: Colorado State University; NSF Organization: DUE; Start Date: 01/01/2002; Award Amount: \$899,749.00

**Supporting Science Understanding through a Customized Learning Service for Concept Knowledge**

Award Number: 0537194; Principal Investigator: Tamara Sumner; Co-Principal Investigator: Mary Marlino, James Martin, Kirsten Butcher; Organization: University of Colorado at Boulder; NSF Organization: IIS; Start Date: 09/15/2005; Award Amount: \$504,815.00

**Enhancing NSDL.Org with Concept-browsing Interfaces based on AAAS Strand Maps**

Award Number: 0632143; Principal Investigator: Tamara Sumner; Organization: University of Colorado at Boulder; NSF Organization: DUE; Start Date: 09/01/2006; Award Amount: \$74,723.00

### **Strand Maps as an Interactive Interface to NSDL Resources**

Award Number: 0226286; Principal Investigator: Tamara Sumner; Co-Principal Investigator: Greg Janee, Mary Marlino, Michael Wright; Organization: University of Colorado at Boulder; NSF Organization: DUE; Start Date: 01/01/2003; Award Amount: \$450,000.00

### **Collaborative Research: Developing a Computational Model of "Quality" for Educational Digital Libraries**

Award Number: 0534581; Principal Investigator: Tamara Sumner; Co-Principal Investigator: James Martin; Organization: University of Colorado at Boulder; NSF Organization: IIS; Start Date: 09/01/2006; Award Amount: \$382,508.00

### **Enrich: Enriching Representations of Work to Support Organisational Learning**

Principal Investigator: Zdenek Zdrahal; Co-Principal Investigator: Tamara Sumner; Organization: The Open University; Esprit Thematic Call "IT for Learning and Training in Industry", EU Fourth Framework Programme, Start Date: 1998; Award Amount: ECU 965,214

### **Towards Designing Scholarly Documents for the World Wide Web**

Principal Investigators: Tamara Sumner and Nathalie Bonnardel; Organization: The Open University; Funded by British Council Alliance Programme for Franco-British Joint Research; Start Date: January 1998; Award amount: £6,000

### **Journal of Computation and Mathematics**

Principal Investigator: Tamara Sumner and Simon Buckingham Shum; Organization: The Open University; Funded by the London Mathematical Society. Start Date: February, 1997. Award amount: £25,000.

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## **Teaching Activity**

### ***Courses Taught***

Cognitive Science Research Practicum, CSCI 7412/7422, EDUC 6506/6516, LING 7415/7425, PHIL 7415/7425, PSYC 7415/7425, 2 units, University of Colorado at Boulder

Topics in Cognitive Science, CSCI 7772, EDUC 7775, LING 7775, PHIL 7810, PSYC 7775, and SLSH 7775, 1 unit, University of Colorado at Boulder

Readings and Research in Cognitive Science, CSCI 7762, EDUC 6505, LING 7762, PHIL 7310, and PSYC 7762, 2 units, University of Colorado at Boulder

User Interface Design, CSCI 4838/6838, 3 units, University of Colorado at Boulder

Technology for Community, CSCI 2830/4830, 3 units, University of Colorado at Boulder

Internet Dreams, CSCI 4830/7000, 3 units, University of Colorado at Boulder

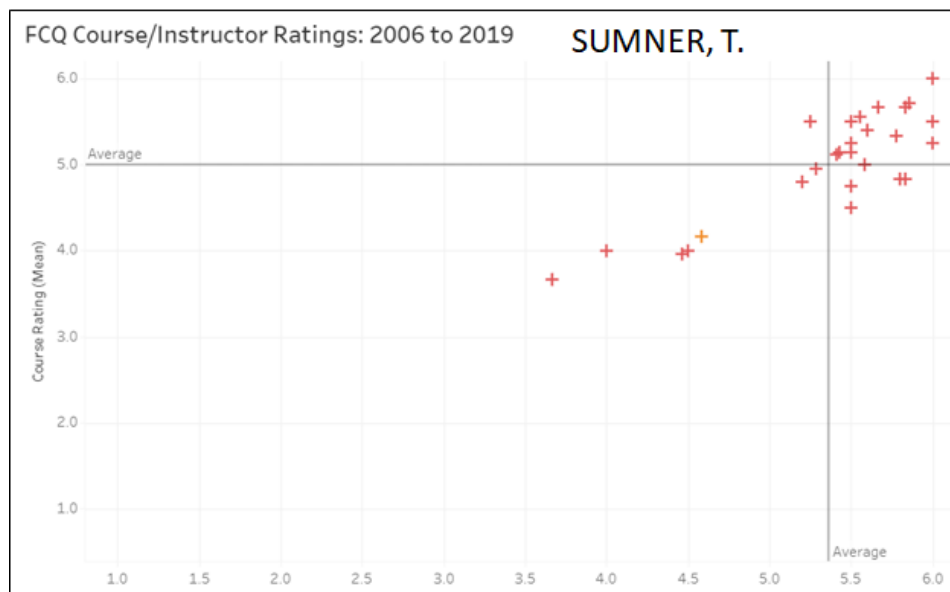
Introduction to PhD Research in Computer Science, CSCI 7900, 1 unit, University of Colorado at Boulder

Introduction to Artificial Intelligence, CSCI 3202, 3 units, University of Colorado at Boulder

Independent Studies in Computer and Cognitive Science, graduate level and undergraduate

Computing: An Object-oriented Approach, Introductory Computer Science Course, M206, Served 5000+ undergraduate students annually, The Open University, UK

## Faculty Course Questionnaire Results: Scale from 1 (low) to 6 (high)



Note: This figure does not include all courses taught as the university's automated FCQ system does not always reliably collect and report on cross-listed courses, due to technical challenges and student privacy guidelines, and per Institute policy, FCQ's are not collected for our one unit Topics course.

### Graduate Students – Principal Thesis Advisor or Co-Advisor

#### Current PhD Students

- Tom Curran. Computer Science
- Ali Raza. Joint PhD in Computer Science and Cognitive Science.
- Michael Schneider. Computer Science
- Jay Luther. Computer Science

- 2020 *Bhaduri, Srinjita*. Joint PhD in Computer Science and Cognitive Science. Dissertation Title: Teach3D: A Toolkit for Effective Teaching of 3D Modeling and Spatial Thinking Skills in Middle School
- 2019 *Gendreau-Chakarov, Alexandra*. Joint PhD in Computer Science and Cognitive Science. Dissertation Title: Integrating Computational Thinking into Middle School Science Curriculum Using Programmable Sensor Technologies
- 2018 *Quigley, David*. Joint PhD in Computer Science and Cognitive Science. Dissertation Title: A Learning Analytics Approach to Scaffolding Scientific Modeling in the Classroom
- 2016 *Severance, Samuel*. Joint PhD in Education and Cognitive Science. Principal Thesis Co-Advisor with William Penuel in School of Education. Dissertation Title: Teacher and Student Supports for Implementation of the NGSS
- 2016 *Dibie, Ogheneovo*. PhD in Computer Science. Dissertation Title: Computational methodologies for understanding the dynamics of an online community of educators

- 2016 *Danesh, Soheil*; PhD in Computer Science; Dissertation Title: Gaining Insight into Text Datasets Through Communities of Key Terms
- 2015 *Schaeffbauer, Chris*. PhD in Computer Science. Dissertation Title: Using health behavior theory to develop and evaluate a mobile application to promote healthy eating
- 2015 *Sultan, Arafat Md*. PhD in Computer Science. Dissertation Title: Semantic Comparison of Short Text Fragments: Algorithms and Applications
- 2015 *Okoye, Ifeyinwa*. Joint PhD in Computer and Cognitive Science. Dissertation Title: Building an Educational Recommender System based on Conceptual Change Learning Theory to Improve Students' Understanding of Science Concepts
- 2013 *Maull, Keith*. PhD in Computer Science. Dissertation Title: Computational Methods for Analyzing and Understanding Online Curriculum Planning Behavior of Teachers
- 2012 *Agarwal, Kirun*. MS in Computer Science. Dissertation Title: Visualizing the Flow and Usage of Curricular Components in an Online Curriculum Planning and Teaching Tool
- 2011 *Saldivar, Manuel*. Joint PhD in Education and Cognitive Science. Principal Thesis Co-Advisor with Ben Kirshner in School of Education and GRA Supervisor. Dissertation Title: Earth Science Educators' Adoption and Integration of a Web-based Instructional Planning System
- 2010 *Wetzler, Philipp*. PhD in Computer Science. Principal Thesis Co-Advisor with James Martin. Dissertation Title: Automatically Assessing the Quality of Educational Digital Library Resources
- 2010 *Surles, Robert*. Joint PhD, Department of Planning and Design and Institute of Cognitive Science, Principal Thesis Co-Advisor with Willem Van Vliet. Dissertation Title: Cognitive Science as Social Learning in Participatory Design and Planning for Environmental Sustainability in the Lower Ninth Ward, New Orleans, Louisiana
- 2009 *Gu, Qianyi*. PhD in Computer Science, Dissertation Title: Personalized Information Seeking to Support Intentional Learning
- 2008 *Motta, David*. MS in Computer Science. Principal Thesis Co-Advisor with Barbara Buttenfield in the Department of Geography. Dissertation Title: General Eyes: A web application enabling geographers to visualize differences between multi-scale generalization algorithms.
- 2008 *Ahmad, Faisal*. PhD in Computer Science. Dissertation Title: Generating Conceptually Personalized Interactions for Educational Digital Libraries Using Concept Maps
- 2008 *Khan, Huda*. Joint PhD in Computer Science and Cognitive Science, Principal Thesis Co- Advisor with Hilda Borko in the School of Education. Dissertation Title: The central role of adaptation for curriculum enactment: designing educational software for digital curriculum customization and developing a digital library contextualization service
- 2008 *de la Chica, Sebastian*. PhD in Computer Science, Principal Thesis Co-Advisor with Jim Martin. Dissertation Title: Generating Conceptual Knowledge Representations to Support Students Writing Scientific Explanations
- 2007 *Eiteljorg, Eric*. Joint PhD in Education and Cognitive Science, Principal Thesis Co-Advisor with Hilda Borko in the School of Education. Dissertation Title: Integrating New Technologies into a Professional Development Program: A Study of the Impact of Video and Online Technologies

- 2006 *Lenell, Elizabeth*. Joint PhD in Education and Cognitive Science, Principal Thesis Co-Advisor with Philip Langer in the School of Education. Dissertation Title: Science teachers' online search strategies for seeking inquiry-based lesson activities
- 2006 *Le, Phong*. MS in Computer Science. Dissertation Title: Design Patterns for Online Learning Environments: A Structured Approach for Operationalizing and Sharing Theory-Based Design Knowledge
- 2005 *Custard, Myra*. MS in Computer Science. Dissertation Title: Computing Quality of Web Pages for Educational Digital Libraries
- 2004 *Khoo, Michael*. PhD in Communication, Principal Thesis Co-Advisor with Michelle Jackson in the Dept of Communication. Dissertation Title: On being on the same page: Organizational communication and the user-centred development of a digital library collection.
- Highlights: Khoo received one of three Graduate Student Research and Creative Work Awards in 2003-2004 for his dissertation research. The award, which is determined by faculty review, acknowledges outstanding research or creative work by CU-Boulder graduate students across all disciplines.
- 2004 *Bhushan, Sonal*. MS in Computer Science. Dissertation Title: Designing Visual Components for Creating Conceptual Browsing Interfaces
- 2004 *Ahmad, Faisal*. MS in Computer Science. Dissertation Title: A Strand Map Service for Educational Digital Libraries
- 2003 *Lu, Lian*. ME in Computer Science, Dissertation Title: The Geospatial Discovery Project
- 2001 *Weatherley, John*. MS in Computer Science. Dissertation Title: Adapting Education Resources for Collaborative On-Line Peer Review
- 1999 *Caron, John*. ME in Computer Science, Dissertation title: Applying Latent Semantic Analysis to Online Customer Support: A Trial Study

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## University Service

- 2020 - Present Academic Affairs Budget Advisory Committee (AABAC)
- 2020 - Present CEAS Research Leadership Group
- 2019 - Present Academic Review and Planning Advisory Committee (ARPAC)
- 2018 - Present Early Career Faculty Mentor (Devendorf), ATLAS
- 2016 - Present Director, Institute of Cognitive Science
- 2020 RIO [Post-Lockdown] Return-to-Research Planning Committee
- 2019 Academic Futures Interdisciplinarity Task Force
- 2019 DAICR Benefits Small Working Group
- 2019 School of Computing White Paper Committee
- 2018 CU Boulder Open Educational Resources (OER) Committee
- 2017 Member, Institute Director Review Committee (Kociolek)



2016 - 2017 Member, Dean's Level Review Committee, School of Education

2015 - 2018 Member, Primary Unit Evaluation Committee, Dept of Computer Science

2014 - 2015 Member, Search Committee, Institute of Cognitive Science

2011 - 2013 Member, Dean's Tenure Review Committee, University Libraries

2011 - 2012 Chair, Academic Program Review, Institute of Cognitive Science

2011 - 2011 Co-Chair, IJCMT Discussion Group with Grunwald & Larson

2010 - 2011 Member, Primary Unit Evaluation Committee, Dept of Computer Science

2008 - 2010 Chair, IGERT Planning Committee, Institute of Cognitive Science

2006 - 2013 Early Career Faculty Mentor (Siek), Dept of Computer Science

2006 - 2007 Member, Graduate Committee, Dept of Computer Science

2004 - 2005 Member, Undergraduate Committee, Dept of Computer Science

2004 - 2005 Director of Academic Programs, Institute of Cognitive Science

2003 - 2004 Member, Fundraising Committee, Dept of Computer Science

2001 - 2003 Member, Graduate Committee, Dept of Computer Science

1999 - 2001 Member, Executive Committee, Dept of Computer Science

1999 - 2000 Member, Strategic Futures Council, College of Engineering and Applied Sciences

1999 Member, Discovery Learning Initiative Committee, College of Engineering and Applied Sciences

1996 - 1998 Research Degree Student Coordinator, Knowledge Media Institute, The Open University

1997 - 1998 Member, Collaborative Publishing Subcommittee, The Open University

## **Professional Service**

### ***Current Editorial and Program Committee Activities***

2018 - Present International Conference on Learning Analytics & Knowledge (LAK), Program Committee

2018 - Present Information and Learning Sciences, Editorial Board

### ***Previous Editorial and Program Committee Activities***

2003 – 2018 Editorial Board, International Journal of Digital Libraries, Springer-Verlag Heidelberg

1996 – 2005 Co-founder and Co-editor of The Journal of Interactive Media in Education, The Open University

2004 - 2018 ACM/IEEE Joint Conference on Digital Libraries (JCDL), Program Committee

2012 - 2018 International Conference on Theory and Practice of Digital Libraries (TPDL), Program Committee

2007 - 2010 European Conference on Digital Libraries (ECDL) (Renamed to TPDL), Program

## Committee

2001 - 2003 Interact, Program Committee

### ***Conference Organizing Committee and Chair Positions***

ACM/IEEE Joint Conference on Digital Libraries (JCDL 2005), Denver, CO, Organizing Committee

Conference on Computer-Support for Collaborative Learning (CSCL 2002), Boulder, CO, Organizing Committee

Best Paper Selection Committee Chair, Digital Libraries (DL 2014)

Workshops and Tutorials Co-Chair. ACM/IEEE Joint Conference on Digital Libraries and International Conference on Asian Digital Libraries. (JCDL/ICADL 2010)

Publicity Co-Chair, European Conference on Digital Libraries (ECDL 2006)

Technical Program Co-Chair. ACM/IEEE Joint Conference on Digital Libraries (JCDL 2005)

Workshops and Tutorials Chair, European Conference on Digital Libraries (ECDL 2004)

Associate Chair, ACM Conference on Computer-Human Interaction (CHI 2002)

Workshop Chair, Conference on Computer-Support for Collaborative Learning (CSCL 2002)

### ***Advisory Boards, Expert Panels, and Other Committees***

Chair of External Review Committee, Center for Mind, Brain, and Culture (CMBC), Emory University, November 1-3, 2021

American Association of School Librarians, Member of advisory board for Causality: School Libraries and Student Success II, 2015 – 2019

National Center for Women & Information Technology, Member of advisory board for EngageCS Edu, 2015 – 2019

Concord Consortium, Member of advisory board to Large Scale Research on Engineering Design using Learning Analytics project, 2014 - 2017

American Museum of Natural History, Member of advisory board to Moving Next Generation Science Standards into Practice Program, 2013 – 2016

Project Tomorrow. Member of advisory board to Teachers' Readiness to Adopt and Adapt Content, 2011– 2015

National Science Foundation/NASA, GLOBE Expert Panel, 2014

National Science Teachers Association, Member of advisory board to Classroom Opportunities Multiply with Practice and the Application of Science Standards Project, 2012– 2014

Library of Congress. Steering Committee for Digital Preservation Outreach and Education Initiative, 2010 – 2012

NSF Broadening Participation in Computing, Member of advisory board to PAIRS project. 2008 – 2010

Praxis Educational Group. Member of advisory board. 2008 – 2009

Drexel University, Member of advisory board to Virtual Math Program, 2008 – 2010

The Open University, Member of International Research Advisory Group to OpenLearn, an open content initiative sponsored by the Hewlett Foundation, 2006 – 2007

Smithsonian Institution Astrophysical Observatory, Member of advisory board to Harvard-Smithsonian Digital Video Library, 2002 – 2003

Chair, Educational Impact and Evaluation Standing Committee, National Science Digital Library, 2002 – 2003

Member, Working Group on Digital Libraries in Education, UNESCO Institute for Information Technologies in Education, 2002 – 2003

Member of the Strategic Requirements Board, European Community DG XIII/C. 1998 – 1998

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## **K12 Educational Outreach**

### ***Presentations to School District and State Education Leaders***

Sumner, T., and J. Stearns. 2015. 'Software tools supporting Science Teaching and Learning', January 5, Presentation to the STEM Curriculum and Instruction Department of the Metropolitan School District of Warren Township: Indianapolis, IN.

Sumner, T. & Stearns, J. (2014). The Curriculum Customization Service and Inquiry Hub Biology. November 16-18, A series of ten presentations and demonstrations presented at the K-12 Education Congress, Dallas, TX to school district leaders from: Iredell-Statesville Schools (NC), Norman Public Schools (OK), Portland Public Schools (OR), Papillion-La Vista School District (NE), Racine USD (WI), Spokane Public Schools (WA), Baldwin County School District (AL), Eden Prairie Schools (MN), Warren Township School District (IN), and Horry County Schools (SC).

Sumner, T., H. Leary, and D. Caccamise. 2013. 'Software tools supporting instructional planning and differentiation', April 8, Presentation to Science Education staff at the Colorado Department of Education: Denver, CO.

Sumner, T. 2013. 'Online tools for Customizing STEM Curriculum', Feb 4, Sarasota County Schools, Florida.

Sumner, T., and H. Devaul. 2010a. 'Understanding Impact: Preliminary CCS Field Trial Results', March 3, Presentation to STEM Curriculum and Instruction Department in Denver Public Schools: Denver, CO.

———. 2010b. 'Understanding Impact: Preliminary Results from a District-Wide Field Trial of the NSDL Curriculum Customization Service', April 19, Presentation to STEM Curriculum and Instruction Department at Davis School District: Farmington, UT.

———. 2010c. 'Understanding Impact: Preliminary Results from a District-Wide Field Trial of the NSDL Curriculum Customization Service', April 21, Presentation to STEM Curriculum and Instruction Department in Douglas County School District, Castle Rock, CO.

———. 2010d. 'Understanding Impact: Preliminary Results from a District-Wide Field Trial of the NSDL Curriculum Customization Service', April 26, Presentation to Middle and High School Earth science educators in St. Vrain Valley School District: Longmont, CO.

- . 2010e. 'Customizing Science Instruction With Educational Digital Libraries', August 23, Presentation to STEM Curriculum and Instruction Department in Aurora School District, Aurora, CO
- Sumner, T. and Melhado, L. 2010. 'Customizing Science Instruction With Educational Digital Libraries', September 30, Presentation to STEM Curriculum and Instruction in Department at Mapleton School District, Denver, CO.
- Sumner, T. 2010. 'Customizing Science Instruction With Educational Digital Libraries', November 5, Presentation to STEM Curriculum and Instruction Department in Clark County School District, Las Vegas, NV
- Sumner, T. 2009. 'The Strand Map Service: Technologies supporting differentiated instruction', September 22, Presentation to staff from the Indiana Department of Education: Indiana.
- Sumner, T., and M. Wright. 2009. 'The Strand Map Service and the Curriculum Customization Service: Technologies supporting differentiated instruction', November 16, Presentation to the CIO and K12 Science Leadership Team for Montgomery County Schools: Rockville, MD.
- Sumner, T. 2008. 'Increasing Achievement for all Students through Customized Instruction', April 16, Presentation to Department of Teaching and Learning and the Department of Technical Services: Denver Public Schools, Denver, CO.

### ***Presentations to Educational Publishers and Curriculum Developers***

- Sumner, T., and J. Stearns. 2015. 'Curriculum Customization Service', Presentation to Senior Managers of Renaissance Learning.
- Sumner, T. 2012. 'Inquiry Hub', February 27, Presentation to Math & Science Team: Encyclopedia Britannica.
- Sumner, T., H Devaul, and M. Wright. 2012. 'Inquiry Hub', February 29, Presentation to Kendall Hunt Publishing Company Executive Team: Denver Public Schools, Denver CO.
- Sumner, T., and M. Wright. 2012. 'Inquiry Hub', August 22, Presentation to Digital Learning Team: Carolina Biological Supply Company.
- Sumner, T., and H Devaul. 2010. 'Understanding Impact: Preliminary Results from a District-Wide Field Trial of the NSDL Curriculum Customization Service', February 26, Presentation to Biological Sciences Curriculum Study (BSCS): Colorado Springs, CO
- Sumner, T., and M. Wright. 2010. 'Understanding Impact: Preliminary Results from a District-Wide Field Trial of the NSDL Curriculum Customization Service', March 8, Presentation to It's About Time/Herff Jones Publishing: Armonk, NY.
- Sumner, T. 2009. 'The Curriculum Customization Service: Version 2 Demonstration and Plans for Scaling Up', April 23, Presentation to the Science Education staff from the American Geological Institute: Washington, DC.
- Sumner, T. 2009. 'The Curriculum Customization Service: Technologies supporting differentiated instruction', September 30, Presentation to staff from the Gottesman Center for Science Teaching and Learning, American Museum of Natural History: New York, NY.

### ***Presentations at Teacher Practitioner Conferences***

Kincaid, P. A., T. Sumner, and J. J. Miller. 2012. 'Customizing Science Instruction with Educational Digital Libraries', March 31, Presentation at the National Science Teachers Association (NSTA) National Conference: Indianapolis, IN.

Kincaid, P and Sumner, T. 2011. Customizing Science Instruction with Educational Digital Libraries, March 13, Presentation at the National Science Teachers Association National Conference, San Francisco.

Kincaid, P., and T. Sumner. 2010. 'Customizing Science Instruction with Educational Digital Libraries', March 13, Presentation at the National Science Teachers Association (NSTA) National Conference: San Francisco, CA.

Pandya, R., H. Devaul, T. Sumner, and M. Marlino. 2003. 'Learn how to use a digital library to enhance Earth system education. Presentation.', March 27-30, Presentation at the National Science Teachers Association (NSTA) National Conference: Philadelphia, PA.

Geary, E., B. L. Aivazian, T. Sumner, M. Khoo, and S. Ireton. 2002. 'Digital Water Education Library Project', November, Presentation to the National Earth Science Teachers Association; National Science Teachers Association Area Convention: Portland, OR.