

Alexandria K. Hansen

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College of Science & Mathematics
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CURRENT APPOINTMENTS

2018- current **Assistant Professor, Science Teacher Education**
Co-Coordinator, Natural Sciences Degree Program
Assistant Director, STEM Education Center
California State University, Fresno

EDUCATION

2018 **University of California, Santa Barbara**
Ph.D. Science Education
Committee: Dr. Danielle Harlow, Dr. Julie Bianchini & Dr. Jason Duque
Dissertation: How Preservice Elementary Teachers' Design and Facilitation of a Maker Faire Activity Contributes to Differences in Children's Learning

2015 **University of California, Santa Barbara**
M.A. Science Education

2011 **Loyola Marymount University, Los Angeles**
Secondary Science Teaching Credential (Cleared 2013)

2010 **University of California, Irvine**
B.S. Biological Sciences; Education Minor

PROFESSIONAL EXPERIENCE

2016-18 **Graduate Student Researcher**, Department of Education, UC Santa Barbara
Science and Mathematics Teacher Research Initiative (SMTRI)

2016-18 **Graduate Student Researcher**, Department of Education, UC Santa Barbara
CalTeach: Science & Mathematics Initiative

2013-18 **Program Coordinator**, California NanoSystems Institute, UC Santa Barbara
School for Scientific Thought

2016 **Curriculum Designer & Consultant**
The Wolf Museum of Exploration and Innovation (MOXI), Santa Barbara, CA

2013-16 **Graduate Student Researcher**, Department of Computer Science, UC Santa Barbara
Developing Elementary Learning Progressions to Integrate Computational Thinking

2014-15 **Graduate Student Evaluator**, California NanoSystems Institute, UC Santa Barbara
Center for Science and Engineering Partnerships

TEACHING EXPERIENCE

UNIVERSITY:

- 2018- current **Secondary Science Teaching Methods**
Department of Curriculum & Instruction, Fresno State University
- Environmental Earth & Life Science**
Department of Biology, Fresno State University
- Nature of Science**
Department of Biology, Fresno State University
- Undergraduate Research Supervisor**
Department of Biology, Fresno State University
- 2016-18 **Undergraduate Research Supervisor**
Department of Education, UC Santa Barbara
- 2013-18 **Elementary Science Teaching Methods**, Teaching Assistant
Teacher Education Program, UC Santa Barbara
- 2013-15 **Masters of Education (M.Ed.) Facilitator**
Teacher Education Program, UC Santa Barbara

ELEMENTARY & SECONDARY (K-12) SETTINGS:

- 2013-16 **Elementary Computer Science Instructor**, Santa Barbara & Oxnard, CA
Kids Engaged in Learning Programming and Computer Science (KELP-CS)
- 2013-14 **Lego Engineering Instructor**, Ventura, CA
Play-Well TEKnologies
- 2010-13 **Middle School Science Teacher**, Los Angeles, CA
California Academy for Liberal Studies Charter Middle School
- 2011-12 **Middle School Math Teacher**, Los Angeles, CA
California Academy for Liberal Studies Charter Middle School
- 2010-12 **Corps Member**, Los Angeles
Teach for America
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SCHOLARSHIP

REFEREED JOURNAL ARTICLES:

Hansen, A.K., Gribble, J., Moran, A., Hansen, E.R., Harlow, D.B. (Accepted). Making computer science accessible. Submitted to *Science & Children*.

Carpenter, S.L., Iveland, A., Moon, S., **Hansen, A.K.**, Harlow, D. B., & Bianchini, J. A. (2019). Models are a “metaphor in your brain”: How potential and preservice teachers understand the science and engineering practice of modeling. *School Science and Mathematics*, 119(5), 275-286. <https://doi.org/10.1111/ssm.12340>

Hansen, A.K., McBeath, J.K., and Harlow, D.B. (2019) No bones about it: How digital fabrication changes student perceptions of their role in the classroom," *Journal of Pre-College Engineering Education Research (J-PEER)*: Vol. 9: Iss. 1, Article 6. <https://doi.org/10.7771/2157-9288.1155>

Harlow, D., Dwyer, H., **Hansen, A.K.**, Iveland, A., & Franklin, D. (2018). Ecological design based research in computer science education: Affordances and effectivities for elementary school students. *Cognition and Instruction*, 36(3). <https://doi.org/10.1080/07370008.2018.1475390>

Hansen, A.K., Hansen, E.R., Harlow, D.B. (2018). Fabricating fidgets to support inclusive maker education. *Connected Science*. Available at <http://csl.nsta.org/2018/08/fabricating-fidgets/>

Harlow, D.B. & **Hansen, A.K.** (2018). School Maker Faires as Preservice Teacher Education. *Science & Children*, 55(7), 30-37.

Arya, D., Harlow, D.B., **Hansen, A.K.**, Harmon, L., McBeath, J.K., Pulgar, J. (2017). Innovative youth: An engineering and literacy integrated approach. *Science Scope*, 40(9), 82-88.

Hansen, A.K., Iveland, A., Dwyer, H.A., Franklin, D., Harlow, D.B. (2015). Programming science digital stories: Computer science and engineering design in the science classroom. *Science and Children*, 53(3), 60-64.

BOOK CHAPTERS:

Harlow, D.B., Skinner, R., **Hansen, A.K.**, McBeath, J., Barriault, C., Pulgar, J., McLean, M., Spina, A. (In Press). Creating STEM learning opportunities through partnerships. *Handbook of Research on STEM Education*.

Harlow D.B., **Hansen A.K.**, McBeath J.K., Leak A.E. (2018) Teacher education for maker education: Helping teachers develop appropriate PCK for engaging children in educative making. In: Uzzo S., Graves S., Shay E., Harford M., Thompson R. (Eds.) *Pedagogical Content Knowledge in STEM. Advances in STEM Education*. Springer, Cham.

Harlow, D.B., Dwyer, H.A., **Hansen, A.K.**, Hill, C., Iveland, A., Leak, A., Franklin, D. (2015). Computer programming in elementary and middle school: Connections across content. In M. Urban and D. Falvo (Eds.) *Improving K-12 STEM educational outcomes through technological integration*, 337-361. Hershey, PA: IGI Global.

PEER-REVIEWED CONFERENCE PROCEEDINGS:

- Weinstein, D., **Hansen, A.K.**, Harlow, D., Franklin, D. (2018). Starting from Scratch: Outcomes of early computer science learning experiences and implications for what comes next. In *Proceedings of the 14th International Conference on Computing Education Research (ICER '18)*. Espoo, Finland: ACM.
- Hansen, A.K.**, Hansen, E.R., Hall, T., Fixler, M., Harlow, D. (2017). Fidgeting with fabrication: Students with ADHD making tools to focus. In *Proceedings of FabLearn: Conference on Creativity and Fabrication in Education (FabLearn '17)*. Palo Alto, CA: ACM.
- Gribble, J., **Hansen, A.K.**, Harlow, D.B, Franklin, D. (2017). Cracking the code: The impact of computer coding on the interactions of a child with autism. In *Proceedings of the 16th International Conference on Interaction Design and Children (IDC '17)*. Palo Alto, CA: ACM.
- Hansen, A.K.**, Dwyer, H.A., Iveland, A., Talesfore, M., Wright, L., Harlow, D.B., Franklin, D. (2017). Assessing children's understanding of the work of computer scientists: The draw-a-computer scientist test. In *Proceedings of the 48th Technical Symposium on Computer Science Education (SIGCSE '17)*. Seattle, WA: ACM.
- Franklin, D., Skifstad, G., Rollock, R., Mehrota, I., Ding, V., **Hansen, A.K.**, Weintrop, D., Harlow, D.B. (2017). Using upper-elementary student performance to understand conceptual sequencing in a blocks-based curriculum. In *Proceedings of the 48th Technical Symposium on Computer Science Education (SIGCSE '17)*. Seattle, WA: ACM.
- O'Brien, S., **Hansen, A.K.**, Harlow, D.B. (2016). Educating teachers for the maker movement: Pre-service teachers' experiences facilitating maker activities. In *Proceedings of FabLearn: Conference on Creativity and Fabrication in Education (FabLearn '16)*. Palo Alto, CA: ACM.
- Hansen, A.K.**, Harlow, D.B. (2016). Making and breaking bones: Learning physics through engineering design. In *Proceedings of the Physics Education Research Conference (PERC '16)*. Sacramento, CA.
- Hansen, A.K.**, Iveland, A., Carlin, C., Franklin, D., Harlow, D.B. (2016). User-centered design in block based programming: Developmental and pedagogical considerations for children. In *Proceedings of the 15th International Conference on Interaction Design and Children (IDC '16)*. Manchester, UK: ACM.
- Hansen, A.K.**, Hansen, E.R., Dwyer, H.A., Harlow, D.B., Franklin, D. (2016). Differentiating for diversity: Using universal design for learning in computer science education. In *Proceedings of the 47th Technical Symposium on Computer Science Education (SIGCSE '16)*. Memphis, TE: ACM.
- Franklin, D., Dwyer, H.A., Hill, C., **Hansen, A.K.**, Harlow, D.B. (2016). Initialization in scratch: Seeking knowledge transfer. In *Proceedings of the 47th Technical Symposium on Computer Science Education (SIGCSE '16)*. Memphis, TE: ACM.
- Harlow, D.B., **Hansen, A.K.** (2015). Balancing collaborative and individual work: An example of maker education through mechatronics. In *Proceedings of FabLearn: Conference on Creativity and Fabrication in Education (FabLearn '15)*. Palo Alto, CA: ACM.
- Dwyer, H.A., Hill, C., **Hansen, A.K.**, Iveland, A., Franklin, D., Harlow, D.B. (2015). How students read block-based programs: Predictions, visual cues, and affordances. In *Proceedings of the 11th International Conference on Computer Education Research (ICER '15)*. Omaha, NE: ACM.

- Hansen, A.K.**, Dwyer, H.A., Hill, C., Iveland, A., Martinez, T., Harlow, D.B., Franklin, D. (2015). Interactive design by children: A construct map for programming. In *Proceedings of the 14th International Conference on Interaction Design and Children (IDC '15)*. Boston, MA: ACM.
- Franklin, D., Hill, C., Dwyer, H., Martinez, T., Iveland, A., **Killian, A.**, Harlow, D.B. (2015). Getting started in teaching and researching computer science in the elementary classroom. In *Proceedings of the 46th Technical Symposium on Computer Science Education (SIGCSE '15)*. Kansas City, MO: ACM.

CURRICULA:

- Franklin, D., Harlow, D.B., Dwyer, H., Hill, C., Iveland, A., **Hansen, A.K.** (2016). *Kids Engaged in Learning Programming and Computer Science (KELP-CS), Module 2: Game Design*. Retrieved online from <http://people.cs.uchicago.edu/~dmfranklin/kelpcs/educators/KELPCSMModule1and2.pdf>.
- Franklin, D., Harlow, D.B., Dwyer, H., Henken, J., Hill, C., Iveland, A., **Killian, A.** (2014). *Kids Engaged in Learning Programming and Computer Science (KELP-CS), Module 1: Digital Storytelling*. Retrieved online from <https://discover.cs.ucsb.edu/kelpcs/educators/KELPCSIntro.pdf>.

TECHNICAL REPORTS:

- Hansen, A.K.** & Lenaburg, L. A. (2015). Enhanced support, training and experiences for engineering majors (ESTEEM): Annual evaluation report.
- Hansen, A.K.** & Lenaburg, L. A. (2015). Engineering Ethics Evaluation, Mechanical & Chemical Engineering Departments. Submitted to the National Science Foundation.

MANUSCRIPTS UNDER REVIEW:

- Hansen, A.K.**, Muller, A., Camara, Q., Kaur, P., Martinez, A. (Under review). Connecting STEM learning across boundaries: Secondary teachers' experiences facilitating field trips in Central California. Submitted to the annual meeting of the American Educational Research Association (AERA).
- Carpenter, S., Macias, M., Arevalo, E., **Hansen, A.K.**, Stone, E.M., Bianchini, J.A. (Under review). Preservice science teachers understanding of instruction for diverse learners: A focus on cognitively demanding work. Submitted to the annual meeting of the American Educational Research Association (AERA).
- Hansen, A.K.**, Camara, Q., Kaur, P., Martinez, A. (Under review). A Needs Assessment of Central California Science Teachers: Professional Development Challenges & Opportunities. Submitted to the annual meeting of the National Association for Research in Science Teaching (NARST).
- Carpenter, S., Macias, M., Arevalo, E., **Hansen, A.K.**, Stone, E.M., Bianchini, J.A. (Under review). Preservice Science Teachers' Understanding of Instruction for Diverse Learners: A Focus on Funds of Knowledge. Submitted to the annual meeting of the National Association for Research in Science Teaching (NARST).

MANUSCRIPTS IN PREPARATION:

- Hansen, A.K.** Community-based STEM events as opportunities for novice teachers to engage youth in scientific practices. In preparation: *Journal of Science Teacher Education*.

INVITED TALKS:

- Hansen, A.K.** (2019, July). Designing for *all* students to experience success in STEM education. Invited speaker at the summer meeting of the American Association of Physics Teachers (AAPT) Provo, UT.
- Lambert, R. & **Hansen, A.K.** (2019, April). Rethinking disability in the context of science education. Invited keynote at the Science Community of Practices hosted by the California Partnership for Math + Science Education. Sacramento, CA.
- Hansen, A.K.** (2018, October). Looking closely: Using video analysis to investigate student learning in context. Workshop for undergraduate and graduate students enrolled in a mixed-methods research methodology course at Fresno State University.
- Hansen, A.K.** (2018, September). Tinkering with STEAM Education. Presented at the TEACH conference. Kremen School of Education and Human Development, Fresno State University.
- Hansen, A.K.** (2018, March). School Maker Faires. Talk for preservice elementary school teachers in the Teacher Education Program in the Gevirtz Graduate School of Education, UC Santa Barbara, CA.
- Hansen, A.K.** (2015, March). Interviewing children. Workshop for student in the Gevirtz Graduate School of Education, UC Santa Barbara, CA.
- Killian, A.,** Templeton, J. (2012). Fostering a growth mindset. Professional development workshop for middle school teachers of Partnerships to Uplift Communities (PUC) charter schools. Los Angeles, CA.
- Killian, A.** (2012). Increasing student engagement in the classroom. Professional development workshop for middle school teachers of Partnerships to Uplift Communities (PUC) charter schools. Los Angeles, CA.
- Killian, A.** (2012). Creating rigorous assessments in the science classroom. Professional development workshop for science teachers of Teach for America, Los Angeles, CA.
- Killian, A.** (2011). Planning 101: Creating unit plans and year-long plans. Professional development workshop for science teachers of Teach for America, Los Angeles, CA.

CONFERENCE PRESENTATIONS:

- Hansen, A.K.,** Guan, J., Hall, T., & Supancic, M. (2019, April). How design and facilitation of a Maker Faire activity contributes to differences in children's learning. Paper presented at the annual meeting of the *American Educational Research Association* (AERA '19).
- Hansen, A.K.,** Hall, T., & Supancic, M. (2019, April). Characterizing questioning at an informal science event: A case study of preservice teachers. Paper to be presented at the annual meeting of the *American Educational Research Association* (AERA '19).
- Carpenter, S., **Hansen, A.K.,** Macias, M., Arevalo, E., Stone, E.M., Bianchini, J. (2019, March). Changes in preservice secondary science teachers' understanding of principles of equitable reform-based science instruction. Submitted to the *National Association for Research in Science Teaching* (NARST '19).
- Weintrop, D., **Hansen, A.K.,** Harlow, D.B., Franklin, D. (2018, April). Bringing computer science into elementary classrooms. Presented at the annual meeting of the *American Educational Research Association* (AERA '18). New York, NY.

- Hansen, A.K.**, Carpenter, S., Bianchini, J., Stone, E., Forbes, C. (2018, March). Preparing reform-minded science and mathematics teachers: An empirical investigation across six teacher education programs. Submitted to the *National Association for Research for Science Teaching Annual Conference* (NARST '18). Atlanta, GA.
- Moon, S., **Hansen, A.K.**, Bushong, L., Carpenter, S., Bianchini, J. (2018, March). Examining the effects of teacher education on preservice science and mathematics teacher readiness. Submitted to the *National Association for Research for Science Teaching Annual Conference* (NARST '18). Atlanta, GA.
- Gribble, J., **Hansen, A.K.**, Harlow, D.B, Franklin, D. (2017, June). Cracking the code: The impact of computer coding on the interactions of a child with autism. Paper presented at the *International Conference on Interaction Design and Children* (IDC '17). Palo Alto, CA.
- Hansen, A.K.**, Harlow, D.B. (2017, April). Understanding engineering design in the context of making: Teacher and student perceptions of design thinking in a classroom maker activity. Paper presented at the annual meeting of the *American Educational Research Association* (AERA '17). San Antonio, TX.
- Hansen, A.K.**, Hansen, E., Iveland, A., Gribble, J., Moran, A., Harlow, D.B., Franklin, D. (2017, April). Understanding the challenges and potential of computer science education for elementary school students with disabilities. Paper presented at the annual meeting of the *American Educational Research Association* (AERA '17). San Antonio, TX.
- Hansen, A.K.**, Moon, S., Iveland, A., Carpenter, S., Harlow, D.B., Bianchini, J. (2017, April). Understanding the practices of science and engineering: Perceptions of teachers across the learning-to-teach continuum. Paper presented at the annual meeting of the *National Association for Research in Science Teaching* (NARST '17). San Antonio, TX.
- O'Brien, S., **Hansen, A.K.**, Harlow, D.B. (2016, October). Educating teachers for the maker movement: Pre-service teachers' experiences facilitating maker activities. Paper presented at *FabLearn: Conference on Creativity and Fabrication in Education* (FabLearn '16). Palo Alto, CA.
- Hansen, A.K.**, Harlow, D.B. (2016, July). Making and breaking bones: Learning physics through engineering design. Paper presented at the annual meeting of the *Physics Education Research Conference* (PERC '16). Sacramento, CA.
- Harlow, D.B., **Hansen, A.K.** (2016, July). From rich points to research questions: Building research questions from observational data. Invited panel discussion at the *Physics Education Research Conference* (PERC '16). Sacramento, CA.
- Hansen, A.K.**, Iveland, A., Carlin, C., Franklin, D., Harlow, D.B. (2016, June). User-centered design in block based programming: Developmental and pedagogical considerations for children. Paper presented at the *International Conference on Interaction Design and Children* (IDC '16). Manchester, UK.
- Hansen, A.K.**, Dwyer, H.A., Harlow, D.B., Franklin, D. (2016, April). What is a computer scientist? Developing the draw-a-computer-scientist test for elementary school students. Paper presented at the annual meeting of the *American Educational Research Association* (AERA'16). Washington, DC.
- Hansen, A.K.**, McBeath, J.K., Harlow, D.B. (2016, April). Making meaning of making: Using CHAT to understand digital fabrication in the classroom. Paper presented at the annual meeting of the *American Educational Research Association* (AERA'16). Washington, DC.

- Hansen, A.K.**, Hansen, E.R., Dwyer, H.A., Harlow, D.B., Franklin, D. (2016, March). Differentiating for diversity: Using universal design for learning in computer science education. Paper presented at the *Technical Symposium on Computer Science Education (SIGCSE '16)*. Memphis, TE.
- Franklin, D., Dwyer, H.A., Hill, C., **Hansen, A.K.**, Harlow, D.B. (2016, March). Initialization in scratch: Seeking knowledge transfer. Paper presented at the *Technical Symposium on Computer Science Education (SIGCSE '16)*. Memphis, TE.
- Hansen, A.K.**, Harlow, D.B. (2016, January). Creating equitable and accessible computer science experiences for children. Paper presented at the *American Educational Research Association-UC Santa Barbara STEM Education Conference*. Santa Barbara, CA.
- Harlow, D.B., **Hansen, A.K.** (2015, September). Balancing collaborative and individual work: An example of maker education through mechatronics. Paper presented at *FabLearn: Conference on Creativity and Fabrication in Education (FabLearn '15)*. Palo Alto, CA.
- Hansen, A.K.**, Dwyer, H.A., Hill, C., Iveland, A., Martinez, T., Harlow, D.B., Franklin, D. (2015, June). Interactive design by children: A construct map for programming. Paper presented at the *International Conference on Interaction Design and Children (IDC '16)*. Boston, MA.
- Dwyer, H.A., **Hansen, A.K.**, Iveland, A., Hill, C., Franklin, D., Harlow, D.B. (2015, April). Programming languages and discourse: Investigating the linguistic context in learning computer science during elementary school. Paper presented at the annual meeting of the *American Educational Research Association (AERA'15)*. Chicago, IL.

SERVICE

UNIVERSITY:

- Advisor**, Natural Science Club, Fresno State, 2019
- Outreach Committee**, Member, Department of Biology, Fresno State, 2019
- Master's Thesis Committees**, Departments of Biology and Chemistry, Fresno State, 2018-2019
- Retreat Planning Committee**, Member, Department of Biology, Fresno State, 2018-19
- Assessment Committee**, Member, Department of Biology, Fresno State, 2018-19
- Leadership team**, School Maker Faire, UC Santa Barbara, 2015-18
- Mentor** for incoming graduate students, UC Santa Barbara, 2015-18
- Vice President**, Graduate Student Association of Education, UC Santa Barbara, 2015-16
- Volunteer**, Job search committee, UC Santa Barbara, 2016
- Panelist**, Roundtable for incoming graduate students, UC Santa Barbara, 2014-16

COMMUNITY:

- Fresno Discovery Center**, Executive Board Member, 2019
- California STEM Network Steering Committee**, Member, 2019
- Science events at local schools**, Volunteer, 2013-present
- Goleta Boys and Girls Club**, Volunteer, 2015-2016
- Teach for America**, Corps Member, 2010-2012
- Reading is Fundamental**, Volunteer, 2008-2010
- THINK Together**, Volunteer, 2009-2010

PROFESSIONAL ORGANIZATIONS:

National Association for Research in Science Teaching (NARST), Member, 2016-present

Strand 13 Co-Coordinator, 2018-present

National Science Teachers Association (NSTA), Member, 2015-present

Science and Children, Reviewer, 2016-present

Connected Science Learning, Reviewer, 2019- present

California Science Teachers Association (CSTA), Member, 2017- present

American Association of Physics Teachers (AAPT), Member, 2016-present

Physics Education Research Conference (PERC), Member and reviewer, 2016-present

Interaction Design and Children (IDC), Reviewer, 2016-present

Association for Computing Machinery (ACM), Member and reviewer, 2015-present

American Educational Research Association (AERA), Member and reviewer, 2014-present

Division C: Curriculum & Instruction

Division K: Teacher Education

HONORS, AWARDS & FUNDING

Total Funding: \$143,120

Biology Departmental Travel Grant (\$1000), Fresno State University, 2018-19

Faculty Professional Development Award (\$1200), Fresno State University, 2018-19

Faculty Support Grant (\$1,500), Fresno State University, 2018-19

Excellence in Research Award (\$1,500), UC Santa Barbara, 2017-18

Dennis R. Washington Fellowship (\$60,000), Horatio Alger Association, 2016-18

Dissertation Fellowship (\$12,500), UC Santa Barbara, 2017-18

Conference Travel Grant Awards (\$3,600), UC Santa Barbara, 2014-17

Block Grant Award (\$12,000), UC Santa Barbara, 2014-16

Americorps Grant (\$10,000), Teach for America, 2010-12

Order of Omega Honor Society, UC Irvine, 2010

Dean's Honor List, UC Irvine, 2007-09

Chancellor's Excellence Scholarship (\$40,000), UC Irvine, 2006-08

UNDER REVIEW:

Engineering Environmental Solutions (EES): Leveraging Professional Learning Communities to Improve NGSS-aligned Engineering Education. Submitted to the National Science Foundation's Research on the Formation of Engineers (RFE) call, Proposal ID # 1936832. Requested amount: \$389,441. Co-PIs: Ashley Iveland, Alexandria Hansen, Katherine Nilsen, and Edward Britton.