Dr. Chen Chen

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CURRENT POSITION

Post-doctoral Research Fellow
Chair of Science Education Seminar
Science Education Department,
Harvard-Smithsonian Center for Astrophysics (*2017 - present*)

Research Topics:

- Conceptual change and its interaction with educational technology
- Science education on MOOCs.
- Evaluation of computer simulation in education settings.
- Factors influencing long term success in computer science.
- Online Youth Astronomy Network (https://mo-www.cfa.harvard.edu/MicroObservatory/)
- Impact of in-service teachers' pedagogical content knowledge on students' gains in high school physics, chemistry, and biology.
- Psychometric development of item bank that measures students' Disciplinary Core Ideas (DCIs) based on the Next Generation Science Standards (NGSS).
- Equity in STEM+C education: gender, race, first-generation college students, and readers with dyslexia.

Research methods:

- Large scale survey dataset from national representative sample.
- Large scale sample from online learning platforms (EdX, YouthAstroNet).
- Experiment design for casual inference (RCT, instrument variable, matching & weighting, survey experiment, conjoint analysis).
- Survival analysis for longitudinal user retention dataset.
- Longitudinal growth modeling for learning growth, disjoint growth modeling for treatment sensitive learning growth.
- Unsupervised learning and latent mixture model for learner profile.
- Text mining and structural topic models.
- Structural equation modeling for multivariate relationship.

- Item Response Theory for psychometrics.
- Generalization theory for two-facet nested design.
- Eye-tracking and visual attention tasks.

EDUCATION

Doctor in Human Development and Education
Harvard Graduate School of Education
(2010-2017).

Master of Education in Mind, Brain, and Education
Harvard Graduate School of Education
(2009-2010).

Bachelor's Degree in Psychology
Nanjing University, China
(2005-2009).

DISSERTATION

Title: Romantic Transfer of Cross-Cutting Concepts from Thermodynamic Theories to Personal Theories of Social Control: A Randomized Controlled Experiment

Committee: Helen Haste (Chair); Robert Selman; Matthew Schneps

PAST POSITIONS

Research Assistant, Science Education Department
Harvard-Smithsonian Center for Astrophysics, Cambridge, MA (2015-2017)

- Research in STEM education; EdX MOOCs (CS50 and Super-Earth) evaluation.

Data Analyst, Tisch College of Civil Life
Tufts University, Somerville, MA (2017)

- Longitudinal study (using structural equation modeling) investigating individual, family, and community factors predicting long-term social and civic engagement of youth in Chicago.

Research Consultant, CareFirst Inc.
Baltimore, Maryland (2017)

- Evaluated public health and insurance programs carried out by CareFirst

Research Consultant, Oslo University
Oslo, Norway (2016)

- Investigated the casual effect of a nationwide large scale language and literacy intervention on preschool children's language and social-emotional development.

Research Scientist, Creative-Computing-Lab,

Harvard Graduate School of Education, Cambridge, MA (2016-2017)

- Investigated the effect of graphic based programming language (e.g., Scratch) experience on students' long-term computer science achievement, focusing on casual inference, using matching techniques.

Lab manager, Laboratory of Visual Learning and Science Media Group,
Harvard Smithsonian Center for Astrophysics & MIT, Cambridge, MA (2010-2014)

- Evaluated educational software in science education, with a focus on the effect of various models on conceptual change and the order effect.
- Intervention using apps on mobile devices to provide visual/audio accommodations for dyslexic readers.
- Eye-tracking experiments on dyslexic readers' eye movements under different display formats.

Researcher, Laboratory of Educational Neuroscience,
Harvard Graduate School of Education, Cambridge, MA (2009 - 2013)

- EEG experiment investigating dyslexic reader's visual processing.

Research Assistant, Psychology Department,
Harvard University, Cambridge, MA (2009-2010)

- EEG experiments in neuro-linguistics.

Councilor, Amity Foundation Center for Autistic Children,
Nanjing, China (2008-2009)

- Integrated therapy for autistic young children.
- Group therapy for parents of autistic children.

Counselor, Yangtze River Bridge Suicide Prevention Program,
Nanjing, China (2006-2008)

- Rescuing people who attempt suicide on Yangtze River Bridge and providing further suicide interventions.

TEACHING ASSISTANT POSITIONS AT HARVARD UNIVERSITY

Structural Equation Modeling.
Instructor: Dana McCoy
(*2015-2017*)

Growing Up in the Media World.
Instructor: Joseph Blatt
(*2012-2016*)

Introduction to Methods in Education.
Instructor: Terry Tivnan
(*2012-2015*)

Neuroscience of Typical and Atypical Development.
Instructor: Charles Nelson

(*2015*)

Seminar on Electroencephalography (EEG) and Event-Related-Potential (ERP).
Instructor: Jenny Thomson
(*2011-2014*)

Cognitive Neuroscience and Education.
Instructor: Gigi Luk
(*2012*)

STUDENT RESEARCH ADVISED

Stephanie Hardjo. (*2018-2019*)
Harvard Graduate School of Education.
The Role of Media in Influencing Students' STEM Learning and Career Interest.

Jina Hur. (*2018-2019*)
Harvard Graduate School of Education.
Lost from the Pipeline: Who are the students with high interest in STEM that do not pursue STEM careers?

Tomihiro Ono. (*2019-2020*)
Harvard Graduate School of Education.
The impact of single-sex educational experiences on STEM interest.

Sipho Kargbo. (*2019-2020*)
Harvard Graduate School of Education.
The Role of Classroom Disruption and Disrespect in High School Mathematics Courses on College Calculus Outcomes

FELLOWSHIP AWARDED

Spencer New Civics Early Scholar Fellowship

Harvard Graduate School of Education Dean's Dissertation Fellowship

WORK ON GRANT-FUNDED PROJECTS

All grants were made by the U.S. National Science Foundation (NSF).

Misconceptions-Oriented Standards-Based Assessment Resource for Teachers.
NSF #HER-0412382.

MOSART HSLS: Misconceptions Oriented Standards-Based Assessment Resource for Teachers of High School Life Science.
NSF #DRL-1316645.

MOSART HSPS: Misconceptions Oriented Standards-Based Assessment Resource for Teachers of High School Physical Sciences.
NSF #DRL-1621210

Investigating a Framework for STEM-Reading to Support Secondary School Students with Reading Disabilities.
NSF #HRD-113109

Investigating Strengths People with Learning Differences Bring to STEM.
NSF #HRD- 0930962

The Effects of Dyslexia on Scientists' Analysis of Astrophysical Data.
NSF #HRD- 0726032

Outcome Predictions of Students in Massive Open Online Courses (OPSMOOC).
NSF #DRL-1337166.

Student Outcomes in a Computer Science MOOC (SOCSMOOC).
NSF #DUE-1352696

Persistence Research in Science and Engineering (PRiSE).
NSF #HRD- 0624444.

Factors Influencing College Success in Information Technology (FICSIT).
NSF #CNS-1339200.

Collaborative Research: A study of How Pre-College Informal Activities Influence Female Participation in STEM Careers.
NSF #DRL- 1612375.

PUBLICATIONS

Chen, C., Chen S., Wen., P., Snow, C. (2020). Are screen devices soothing children or soothing parents? Investigating the relationships among children's exposure to different types of screen media, parental efficacy and home literacy practices. *Computers in Human Behavior*. DOI: https://doi.org/10.1016/j.chb.2020.106462

Grant: iRead Foundation

Chen, C., Sonnert, G., Sadler, P. M., Sasselov, D., Fredericks, C. & Malan, D. (2020). Going over the cliff: MOOC dropout behavior at chapter transition. *Distance Education*. 41(1), 6-25. DOI: https://doi.org/10.1080/01587919.2020.1724772

Grant: NSF #DUE-1352696; NSF #DRL-1337166

Chen, C., Sonnert, G., Sadler, P. M., & Sunbury, S. (2020). The impact of high school life science teacher's subject matter knowledge and knowledge of student misconceptions on students' learning. *CBE—Life Sciences Education.* 19(1), ar9. DOI: https://doi.org/10.1187/cbe.19-08-0164

Grant: NSF #EHR-1316645

Schneps, M. H., **Chen, C.**, Sonnert, G., Pomplun, M., Rose, L. T., Banerjee, M., & Greenhill, L. (2020). The advantages of astrophysics for those with reading impairment: an empirical study. *Astronomy for Equity, Diversity and Inclusion Proceedings International Astronomical Union Symposium*. 358.

Grant: NSF #HRD-0726032; NSF #HRD-0930962; NSF #HRD-1131039

Chen, C., Sonnert, G., Sadler, P. M., & Malan, D. (2020). Computational Thinking Skills and Perseverance in Assignment Submission. *Journal of Computer Assisted Learning*.1-14. DOI: https://doi.org/10.1111/jcal.12427

Grant: NSF #DUE-1352696

Chen, C., Sonnert, G., Sadler, P. M., & Malan, D. (2020). Foreseeing the Endgame: Who are the Students Who Take the Final Exam at the Beginning of a MOOC? *Behavior & Information Technology*. 1-13. DOI: https://doi.org/10.1080/0144929X.2019.1711452

Grant: NSF #DUE-1352696

Chen, S., Wen, P., & **Chen, C.** (2020). Vocabulary development of young Uyghur children: Exploring trajectories of receptive and expressive vocabulary. *Journal of Chinese Writing System*.4(1), 19-26. DOI: https://doi.org/10.1177/2513850219891618

Chen, C., Sonnert, G., Sadler, P. M., Sasselov, D., & Fredericks, C. (2019). The impact of student misconceptions on student persistence in a MOOC. *Journal of Research in Science Teaching*. 1-32. DOI: https://doi.org/10.1002/tea.21616

Grant: NSF #DRL-1337166

Chen, C., Sonnert, G., & Sadler, P. M. (2019). The effect of first high school science teacher's gender and gender matching on students' science identity in college. *Science Education*, *104(1)*, 75-99. DOI: https://doi.org/10.1002/sce.21551

Grant: NSF #062444

Chen, C., Jeckel, S., Sonnert, G., & Sadler, P. M. (2019). " Cowboy" and "Cowgirl" Programming and Success in College Computer Science. *International Journal of Computer Science Education in Schools*, *2*(4), n4. DOI: https://doi.org/10.21585/ijcses.v2i4.34

Grant: NSF #1339200

Chen, C., Haduong, P., Brennan, K., Sonnert, G., & Sadler, P. (2019). The effects of first programming language on college students' computing attitude and achievement: a comparison of graphical and textual languages. *Computer Science Education*, *29*(1), 23-48. DOI: https://doi.org/10.1080/08993408.2018.1547564

Grant: NSF #1339200; Scratch Foundation

Schneps, M. H., **Chen, C.**, Pomplun, M., Wang, J., Crosby, A. D., & Kent, K. (2019). Pushing the Speed of Assistive Technologies for Reading. *Mind, Brain, and Education*, *13*(1), 14-29.DOI: https://doi.org/10.1111/mbe.12180

Grant: NSF #HRD-0726032; NSF #HRD-0930962

Chen, S., Zhao, C., Cao, Y., **Chen, C.**, Snow, C. E., & Lu, M. (2019). Long-term effects of China's One Village One Preschool program on elementary academic achievement. *Early Childhood Research Quarterly*, *49*, 218-228. DOI: https://doi.org/10.1016/j.ecresq.2019.06.010

Chen, C., Schneps, M. H., & Sonnert, G. (2016). Order Matters: Sequencing Scale-Realistic Versus Simplified Models to Improve Science Learning. *Journal of Science Education and Technology*, 25(5), 806-823. DOI: https://doi.org/10.1007/s10956-016-9642-4

Grant: NSF #0412382

Chen, C., Schneps, M. H., Thomson, J. M., & Maysn, K. (2016). The Effects of Visual Attention Span and Phonological Decoding in Reading Comprehension in Dyslexia. *Dyslexia*, 22(4), 322-344. DOI: https://doi.org/10.1002/dys.1543

Grant: NSF #HRD-0930962; NSF #HRD-1131039

Jiahui, W., Schneps, M. H., Antonenko, P., **Chen, C.**, Pomplun, M. (2016). Is reading impairment associated with enhanced holistic processing in comparative visual search?. *Dyslexia*, 22(4), 345-361. DOI: https://doi.org/10.1002/dys.1540

Schneps, M. H., Thomson, J. M., **Chen, C.**, Sonnert, G., & Pomplun, M. (2013). E-readers are More Effective Than Paper for Some with Dyslexia. *PloS one*, 8(9), e75634. DOI: https://doi.org/10.1371/journal.pone.0075634

Grant: NSF #HRD-0930962; NSF #HRD-1131039

Schneps, M. H., Thomson, J. M., Sonnert, G., Pomplun, M., **Chen, C.**, & Heffner-Wong, A. (2013). Shorter Lines Facilitate Reading in Those Who Struggle. *PloS one*, 8(8), e71161. DOI:https://doi.org/10.1371/journal.pone.0071161

Grant: NSF #HRD-0930962; NSF #HRD-1131039

MANUSCRIPTS UNDER REVIEW

Title: High School Mathematics and Computer Science Preparation as Predictors of Success in Introductory College Computer Science.
Authorship: **Chen, C.**, Kang, J. M., Sonnert, G., & Sadler P.
Under review: *ACM Transactions on Computing Education (2020 June)*

Grant: NSF #1339200

Title: Ideals of the good life and good science among high achieving men and women scientists: a structural topic modeling approach.
Authorship: **Chen, C.**, Sonnert, G.
Under review: *Signs (2020 Jan)*

Title: What a Difference a Decade makes: The Gender Gap in Students' Career Related Goal Endorsement, From 2007 to 2017
Authorship: **Chen, C.**, Sonnert, G. & Sadler P.
Under review: *Sex Roles (revision)*

Grant: NSF #1612375; NSF #062444

Title: Science efficacy and science preparedness of youths who are interested in becoming politicians.
Authorship: **Chen, C.**, Sonnert, G., Sadler P. & Haste, H.
Under review: *PNAS (2020 June)*

Grant: NSF #1612375

Title: The Role of Media in Influencing Students' STEM Learning and Career Interest.
Authorship: Hardjo, S., **Chen, C.**, Sonnert, G., & Sadler P.
Under review: *Journal of Science Education and Technology (2020 June)*

Title: Romantic Transfer from Thermodynamic Theories to Personal Theories of Social Control: A Randomized Controlled Experiment
Authorship: **Chen, C.**, Chen S. Haste H., Schneps, M. H., & Selman R. L.
Under review: *International Journal of Science Education (2020 April)*

Grant: Spencer New Civics Early Career Scholar Fellowship;
HGSE Dean's Fellowship

Title: Does one more year make a difference? Dosage effect of the One-Village-One-Preschool early childhood education intervention in rural China
Authorship: Chen S., Zhao C., **Chen, C.,** Snow, C. E., & Lu, M.
Under review: *Journal of Education Policy (revision)*

Title: A Brief Introduction to Sensitive Period Theory Increases Experienced Kindergarten Teachers 'Agreeability to Teach for Second Language Acquisition: A Caveat for Neuromyths
Authorship: Chen S. & **Chen, C**.
Under review: *Contemporary Educational Psychology (2019 Oct)*

Title: What Executives Need to Know about the Brain
Authorship: Huber, M., **Chen, C**., & Kasswat, P.
Under review: Institute of Management Accountants *(revision)*

WORKING PAPERS IN PREPARATION FOR SUBMISSION

Title: Gender difference in persistence in STEM career interests, a generational comparison.
Authorship: Doyle, J., **Chen, C**., Sonnert, G., & Sadler P.
Grant: NSF #1612375

Title: Anchoring and Linking Using Item Response Theory in Developing Life Science Test Items for Multiple Age and Expertise Groups.
Authorship: **Chen, C**., Sonnert, G., Sunbury, S., & Sadler P.
Grant: NSF #EHR-1316645

Title: Gender-matching Between High School Computer Science Teachers and Students on Students' Self-Concepts in Computer Science in College.
Authorship: Markicevic, I., **Chen, C**., Sonnert, G., & Sadler P.
Grant: NSF #1339200

Title: The impact of single-sex educational experiences on STEM interest.
Authorship: Ono, T., **Chen, C**., Sonnert, G., & Sadler P.
Grant: NSF #1612375

Title:The Role of Classroom Disruption and Disrespect in High School Mathematics Courses on College Calculus Outcomes
Authorship: Kargbo, S., **Chen, C**., Sonnert, G., & Sadler P.

CONFERENCE PRESENTATIONS

Simulation and plotting are fully mediated by prediction making to promote conceptual gains in high school chemistry. (2020). 1st International Conference on Science and Technology Education. Porto, Portugal.

The impact of student misconceptions on student persistence in a MOOC. (2020). *American Education Research Association (AERA)*. San Francisco, CA. (conference cancelled due to COVID-19).

Factors Predicting Persistence in a Computer Science MOOC. (2019). *American Education Research Association (AERA)*. Toronto, Canada.

The Impact of Early Programming Experience on Success in College Computer Science. (2017). *American Education Research Association (AERA)*. Austin, TX.

Romantic Transfer from Science to Social Concepts: A Randomized Control Trial Study. (2016). *Association for Moral Education (AME)*. Boston, MA.

Putting Realistic Before Simplified Models Promotes Conceptual Change in Science Learning. (2016). *Interdisciplinary Initiative Talk*. Harvard, MA.

School Climate and Civic Beliefs in Chinese High School Students. (2014). *International Society for Political Psychology*. Rome, Italy.

Radical Awareness Mediates Between Chinese Reading and Writing. (2014). International Congress for the Study of Child Language (IASCO). Amsterdam, Netherlands.

Effect of Visual Span on Reading Comprehension and Reading Difficulty. (2013). *Society for the Scientific Study of Reading*. Hong Kong.