

CHI-NING (NICK) CHANG

Life Span Institute
University of Kansas (KU)
 1000 Sunnyside Avenue
 Lawrence, KS 66045

Assistant Research Professor
 cnchang@ku.edu

EDUCATION & TRAINING**Degree Programs**

- 2015 – 2020 **Ph.D., Texas A&M University**
 Educational Psychology (Research, Measurement and Statistics Program)
- 2007 – 2009 **M.Ed., National Taiwan Normal University**
 Department of Education (Sociology of Education Program)
- 2003 – 2007 **B.Ed., National Pingtung University of Education**
 Department of Education (Curriculum and Instruction Program)

Certificate Programs

- 2019 – 2020 **Texas A&M University**
 Academy for Future Faculty
- 2019 **Massachusetts Institute of Technology**
 Machine Learning: From Data to Decisions

RESEARCH INTERESTS

- ◆ Quantitative methodology: Multilevel Models, Structural Equation Modeling, Machine Learning
- ◆ Engineering graduate education and mentoring
- ◆ STEM motivation, achievement, and diversity
- ◆ Program evaluation

EMPLOYMENT

- 2020 – Present **Assistant Research Professor**
 - ◆ Research Design and Analysis (RDA) Unit, Life Span Institute, University of Kansas
- 2015 – 2020 **Graduate Assistant**
 - ◆ Center for Teaching Excellence, Texas A&M University

- ◆ NSF Projects:
 - Data-Enabled Discovery and Design of Energy Materials (D3EM), funded by the National Science Foundation Research Traineeship (NRT) Program. (Funding Source: NSF-DGE-1545403)
 - The Texas A&M System AGEP Alliance: A Model to Advance Historically Underrepresented Minorities in the STEM Professoriate, funded by National Science Foundation (Funding Sources: NSF 1723255, 1723260, 1723165, and 1723253)

2010 – 2015

Researcher & Data Scientist

- ◆ Center for Educational Research and Evaluation, National Taiwan Normal University
- ◆ Government Projects:
 - Taiwan Teacher Education Database
 - Taiwan Integrated Postsecondary Education Database
 - Taiwan Upper Secondary Education Database
 - Taipei Educational Decision-Making System

RESEARCH GRANTS & AWARDS**Research Grants**

2020 – 2021

NSF COVID-19 RAPID Grant

“RAPID: Collaborative Research: Electronic Mentoring to Address Challenges in Engineering Graduate Programs During the COVID-19 Pandemic.” A Collaborative Research Project Funded by the Coronavirus Aid, Relief, and Economic Security (CARES) Act through NSF’s Division of Graduate Education. PIs: Chi-Ning Chang (NSF-DGE-2031069, \$44,582) & Guan Saw (NSF-DGE-2031066, \$109,317).

2018 – 2020

Education Research Grant

“Modeling Measurement Errors for Multilevel Observational Data in Education: Theory and Application.” Funded by the Ministry of Education, Taiwan (\$32,000). PI: Chi-Ning Chang.

2019

College of Education and Human Development Research Grant

“Machine Learning in Education: Theory and Applications.” Funded by the College of Education and Human Development, Texas A&M University (\$1,132). PI: Chi-Ning Chang.

2018

College of Education and Human Development Research Grant

“A Machine Learning Approach to Uncovering the STEM Pipeline from High School through College — Evidence from National Longitudinal Data.” Funded by the College of Education and Human Development, Texas A&M University (\$845). PI: Chi-Ning Chang.

Awards

2020

Distinguished Honor Graduate Award

Awarded by College of Education and Human Development, Texas A&M University.

2015 – 2017

Study Abroad Scholarship

Award-winning proposal: “Big Data in Education: Educational Database Value-added Application and Policy Analysis,” Study Abroad Scholarship in Education, Taiwan (\$86,667).

2015

Emerging Scholar Award

Awarded by College of Education and Human Development, Texas A&M University.

2015

Lechner Graduate Scholarship

Awarded by College of Education and Human Development, Texas A&M University (\$2,500).

2010 – 2019

Research Travel Funds

Travels to conferences & workshops. Funded by Texas A&M University, University of California Berkeley, NSF, National Science Council (Taiwan), & National Taiwan Normal University (\$12,494 total).

RESEARCH PUBLICATIONS

Peer-Reviewed Research Articles

([Google Scholar Citations](#): Citations: 45; h-index: 3)

13. **Chang, C. N.**, Patterson, C. A., Harmon, W. C., Fowler, D., & Arroyave, R. (2020). Intellectual Community as a Bridge of Interdisciplinary Graduate Education in Materials Data Science. *MRS Advances*, 1-8. <https://doi.org/doi:10.1557/adv.2020.140> [Emerging Sources Citation Index (ESCI)]
12. Denton, M., Borrego, M., **Chang, C. N.**, Arroyave, R., & Boklage, A. (2020, accepted). Non-academic Career Pathways for Engineering Doctoral Students: An Evaluation of an NSF Research Traineeship Program. *2020 American Society for Engineering Education (ASEE) Annual Conference & Exposition*, 1-17. [Engineering Index (EI)]
11. Patterson, C. A., **Chang, C. N.**, Pardo, M., Lavadia, C., Fowler, D., & Butler K. L. (2019). Transforming Doctoral Education: Preparing Multidimensional and Adaptive Scholars. *Studies in Graduate and Postdoctoral Education*, 11(1), 17-34. <https://doi.org/10.1108/SGPE-03-2019-0029> [Emerging Sources Citation Index (ESCI)]
10. **Chang, C. N.**, Patterson, C. A., Lavadia, C., Fowler, D., & Arroyave, R. (2019). Showcasing Interdisciplinary Capabilities: Employers' Perceptions on Reflective ePortfolios. *2019 American Society for Engineering Education (ASEE) Annual Conference & Exposition*. <https://peer.asee.org/33264> [Engineering Index (EI)]
9. Saw, G. K., Brewington, S., Swagerty, B., **Chang, C. N.**, Culbertson, R. (2019). STEM Out-of-School Program: Students' Attitudes Toward and Career Interests in Mathematics and Science. *International Journal of Evaluation and Research in Education*, 8(2), 356-362. <http://doi.org/10.11591/ijere.v8i2.18702> [Indexed by ERIC and Scopus]
8. Gagne, J. R., **Chang, C. N.**, Fang, H. A., Spann, C. A., & Kwok, O. (2019). A Multi-Method Study of Inhibitory Control and Behavior Problems in Preschoolers. *Infant and Child Development*. 28(1), 1-16. <https://doi.org/10.1002/icd.2115> [Social Sciences Citation Index (SSCI) / ISI 2017 impact factor: 1.289]
7. Saw, G. K., **Chang, C. N.**, & Chan, H. Y. (2018). Cross-Sectional and Longitudinal Disparities in STEM Career Aspirations at the Intersection of Gender, Race/Ethnicity, and Socioeconomic Status. *Educational Researcher*, 47(8), 525-532. <https://doi.org/10.3102/0013189X18787818> [Social Sciences Citation Index (SSCI) / ISI 2017 impact factor: 4.000]
6. **Chang, C. N.**, Lavadia, C., Fowler, D., Allaire, D., & Arroyave, R. (2018). Assessing Student Interdisciplinarity: Results from an Interdisciplinary Graduate Program in Science and Engineering Fields. *2018 American Society for Engineering Education (ASEE) Annual Conference & Exposition*. <https://peer.asee.org/29823> [Engineering Index (EI)]
5. Saw, G. K., & **Chang, C. N.** (2018). Cross-lagged Models of Mathematics Achievement and Motivational

Factors among Hispanic and Non-Hispanic High School Students. *Hispanic Journal of Behavioral Sciences*, 40(2), 240-256. <https://doi.org/10.1177/0739986318766511> [Social Sciences Citation Index (SSCI) / ISI 2017 impact factor: 0.864]

4. Arroyave, R., Shields, S., **Chang, C. N.**, Fowler, D., Malak, R., & Allaire, D. (2018). Interdisciplinary Research on Designing Engineering Material Systems: Results from a National Science Foundation Workshop. *Journal of Mechanical Design*, 140 (11), 110801-1 – 11080-9. <http://doi.org/10.1115/1.4041177> [Science Citation Index (SCI) / ISI 2017 impact factor: 2.783]
3. Lavadia, C., **Chang, C. N.**, & Fowler, D. (2018). Student and Faculty Perspectives on the Effectiveness of an Interdisciplinary Graduate Engineering Program. *2018 IEEE Frontiers in Education Conference (FIE)*. <https://doi.org/10.1109/FIE.2018.8658375> [Engineering Index (EI)]
2. **Chang, C. N.**, Semma, B., Fowler, D., & Arroyave, R. (2017). An Interdisciplinary Graduate Education Model for the Materials Engineering Field. *2017 American Society for Engineering Education (ASEE) Annual Conference & Exposition*. <https://peer.asee.org/27578> [Engineering Index (EI)]
1. **Chang, C. N.**, Pardo, M., Semma, B., Fowler, D., Arroyave, R., & Shamberger, P. J. (2017). Data-Enabled Discovery and Design of Energy Materials (D3EM): Structure of An Interdisciplinary Materials Design Graduate Program. *MRS Advances*, 2(31-32), 1693-1698. <https://doi.org/10.1557/adv.2017.228> [Emerging Sources Citation Index (ESCI)]

Book Chapters

- ♦ Weiss, C. H. (1998). Evaluation: Methods for Studying Programs & Policies 2nd edition (Wang, L. Y., Chang, S. C., Li, M. Y., Lin, F. Y., **Chang, C. N.**, and Hsieh, C. C., Trans. 2014 [in Chinese]). New Jersey: Prentice Hall.
- ♦ Peng, S. S. & **Chang, C. N.** (2012). *Preparing Students for Gainful Employment: Lessons from Taiwan College Graduates Surveys*. In Fernex, A. & Lima, L. (Eds.), *To be a student within Bologna process: New insights and studies outcomes*. (ISBN: 978-2-7061-1659-9) (pp. 153-178). France: PUG.
- ♦ **Chang, C. N.** (2010). *Teachers at Rural Junior High Schools in Taiwan [in Chinese]*. In Center for Teacher Education and Graduate Institute of Curriculum Studies at Tamkang University (Ed.), *Curriculum and Instruction of Disadvantaged Students*. (ISBN: 978-986-6717-57-4) (pp.91-106). Taipei: NTNU Press.

Selected Conference Presentations

- ♦ **Chang, C. N.**, Lin, S., Kwok, O., & Saw, G. K. (2020, Apr.). *A Machine Learning Approach to Predicting STEM College Major Choice*. Paper will be presented at the 2020 American Educational Research Association (AERA) Annual Meeting: The Power and Possibilities for the Public Good When Researchers and Organizational Stakeholders Collaborate. Friday, April 17 – Tuesday, April 21, 2020 in San Francisco, CA. [Meeting Cancelled due to the outbreak of COVID-19]
- ♦ **Chang, C. N.**, Patterson, C. A., Harmon, W. C., Fowler, D., & Arroyave, R. (2019, Dec). Intellectual Community as a Bridge of Interdisciplinary Graduate Education in Materials Data Science. Paper presented at the 2019 MRS Fall Meeting, Boston, MA.

- ◆ **Chang, C. N.**, Patterson, C. A., Lavadia, C., Fowler, D., & Arroyave, R. (2019, Jun.). *Showcasing Interdisciplinary Capabilities: Employers' Perceptions on Reflective ePortfolios*. Paper presented at the 2019 American Society for Engineering Education (ASEE) Annual Conference & Exposition, Tampa, FL.
- ◆ **Chang, C. N.**, Lavadia, C., Patterson, C. A., Fowler, D., & Arroyave, R. (2019, May). *What do Employers Value in a Reflective ePortfolio?* Paper presented at the 2019 Transformational Teaching and Learning Conference (TTLC), College Station, TX.
- ◆ Patterson, C. A., Lavadia, C., **Chang, C. N.**, Fowler, D., & Arroyave, R. (2019, May). *Intellectual Community as a Bridge of Interdisciplinary Education*. Paper presented at the 2019 Transformational Teaching and Learning Conference (TTLC), College Station, TX.
- ◆ **Chang, C. N.**, Lavadia, C., Fowler, D., Allaire, D., & Arroyave, R. (2019, Apr.). *A Multidimensional Approach to Evaluating the Students' Research Interdisciplinarity*. Paper presented at the 2019 American Educational Research Association (AERA) Annual Meeting: Leveraging Education Research in a "Post-Truth" Era: Multimodal Narratives to Democratize Evidence. Friday, April 5 – Tuesday, April 9, 2019 in Toronto, Canada.
- ◆ Patterson, C. A., Lavadia, C., **Chang, C. N.**, Fowler, D., & Butler K. L. (2019, Feb.). *A case study: Answering the call to provide transformative doctoral education*. Paper presented at the 2019 Conference of Southern Graduate Schools, Knoxville, TN.
- ◆ Patterson, C. A., Lavadia, C., **Chang, C. N.**, Fowler, D., & Butler K. L. (2019, Jan.). *Transformative Learning Theory: The foundation to innovative doctoral education*. Paper presented at the 2019 Lilly Conference on Evidence-Based Teaching & Learning, Austin, TX.
- ◆ Pardo, M., Fowler, D., Lavadia, C., & **Chang, C. N.** (2018, Nov.). *Learning to Navigate a New Transformative Doctoral Education Model*. Paper presented at the 2018 International Society for the Scholarship of Teaching and Learning, Bergen, Norway.
- ◆ Lavadia, C., **Chang, C. N.**, & Fowler, D. (2018, Oct.). *Student and Faculty Perspectives on the Effectiveness of an Interdisciplinary Graduate Engineering Program*. Paper presented at the 2018 IEEE Frontiers in Education Conference (FIE), San Jose, CA.
- ◆ Early, N., **Chang, C. N.**, & Wickersham, T. (2018, Jul.). *The Relationship between Agriculture Background and Student's Perception of Self in an Animal Science Department*. Paper presented at the 2018 American Society of Animal Science (ASAS) and the Canadian Society of Animal Science (CSAS) Annual Meeting, Vancouver, British Columbia, Canada.
- ◆ **Chang, C. N.**, Lavadia, C., Fowler, D., Allaire, D., & Arroyave, R. (2018, Jun.). *Assessing Student Interdisciplinarity: Results from an Interdisciplinary Graduate Program in Science and Engineering Fields*. Paper presented at the 2018 American Society for Engineering Education (ASEE) Annual Conference & Exposition, Salt Lake City, UT.
- ◆ Gagne, J. R., **Chang, C. N.**, & Kwok, O. (2018, March). *A comprehensive, multi-method investigation of preschool inhibitory control and behavioral maladjustment*. Paper presented at the 2018 Society for Research in Human Development Meeting, Plano, TX.
- ◆ **Chang, C. N.**, Semma, B., Fowler, D., Arroyave, R. (2017, June). *An Interdisciplinary Graduate Education Model for the Materials Engineering Field*. Paper presented at the 2017 American Society for Engineering Education

(ASEE) Annual Conference & Exposition, Columbus, OH.

- ◆ **Chang, C. N.**, Pardo, M., Semma, B., Fowler, D., Arroyave, R., Shamberger, P. J. (2016, Nov.). *Data-Enabled Discovery and Design of Energy Materials (D3EM): Structure of An Interdisciplinary Materials Design Graduate Program*. Paper presented at the 2016 Materials Research Society (MRS) Annual Fall Meeting, Boston, MA.
- ◆ Wang, L. Y., **Chang, C. N.**, & Chiang, S. C. (2014, Sept.). *Network-Based Recommendation Game for Increasing the Response Rate of Web Survey on Higher Education*. Paper presented at the 2014 European Conference on Educational Research (ECER/EERA): The Past, the Future and Present of Educational Research in Europe. Monday, September 1 – Friday, September 5, Porto, Portugal.
- ◆ **Chang, C. N.** & Wang, L. Y. (2014, Sept.). *The Influence of Family and School Factors on Student Achievement in Rural Taiwan*. Paper presented at the 2014 European Conference on Educational Research (ECER/EERA): The Past, the Future and Present of Educational Research in Europe. Monday, September 1 – Friday, September 5, Porto, Portugal.
- ◆ Li, M. Y., Wang, L. Y. & **Chang, C. N.** (2013, Apr.). *Does Marketization Bring in Better Teacher Quality in Taiwan?* Paper presented at the 2013 American Educational Research Association (AERA) Annual Meeting: Education and Poverty: Theory, Research, Policy and Praxis. Friday, April 26 – Wednesday, May 1, 2013 in San Francisco, California, U.S.A.
- ◆ **Chang, C. N.** (2013, Apr.). *High Tuition Fees, High Living Costs: The Relationship among College Costs, Part-time Work, and Academic Involvement*. Paper presented at the 2013 Chinese American Educational Research and Development Association (CAERDA) Annual Meeting: Poverty, Social Justice, and Education in a Global Context. Friday, April 26 – Saturday, April 27, 2013 in San Francisco, California, U.S.A.
- ◆ **Chang, C. N.**, Wang, L. Y. & Chen, W. L. (2012, Apr.). *Effect of Changes of Learning Environment on Student Achievement and Academic Self-Concept*. Paper presented at the 2012 American Educational Research Association (AERA) Annual Meeting: Non Satis Scire: To Know Is Not Enough. Friday, April 13 – Tuesday, April 17, 2012 in Vancouver, British Columbia, Canada.
- ◆ Wang, L. Y., **Chang, C. N.**, & Saw, G. K. (2011, Apr.). *Effect of Fish-Pond-Composition on Students' Math Achievement*. Paper presented at the 2011 American Educational Research Association (AERA) Annual Meeting: Inciting the Social Imagination: Education Research for the Public Good. Friday, April 8 – Tuesday, April 12, 2011. New Orleans, Louisiana, U.S.A.
- ◆ **Chang, C. N.** & Wang, L. Y. (2010, Apr.). *Rurality and Inequality in Education*. Paper presented at the 2010 Chinese American Educational Research and Development Association (CAERDA) International Conference: Conducting and Applying Educational Research to Improve Teaching and Learning. 29 – 30, April, 2010. Denver, Colorado, U.S.A.
- ◆ Saw, G. K. & **Chang, C. N.** (2010, Apr.). *Counterfactual Models of Teacher Effects: The effects of teacher education on student academic performance*. Paper presented at the 2010 American Educational Research Association (AERA) Annual Meeting: Understanding Complex Ecologies in a Changing World. April 30- May 4, 2010. Denver, Colorado, U.S.A.
- ◆ Saw, G. K. & **Chang, C. N.** (2009, Aug.). *Effects of Teacher Preparation on Student Achievement in Taiwan*. Paper presented at the 2009 Annual Meeting of North American Chinese Sociologists Association, San Francisco, California, U.S.A.

TEACHING EXPERIENCE

Graduate Courses

Teaching Assistant at Texas A&M University

- ◆ “EPSY 651 Structural Equation Modeling” (Spring 2019)
- ◆ “EPSY 653 Advanced Structural Equation Modeling” (Fall 2017) (Fall 2019)

Professional Workshops

Instructor at Texas Evaluation Network (TEN)

(TEN is an Affiliate of the American Evaluation Association)

- ◆ “Multilevel Structural Equation Modeling (MSEM)” (Aug. 2019; Teaching Evaluation: 4.5/5.0)

Instructor at the University of Texas at San Antonio

- ◆ “Research & Evaluation Methods (REM) Spring 2019 Workshop Series: Multilevel Structural Equation Modeling (MSEM)” (Apr. 2019; Teaching Evaluation: 4.6/5.0)
- ◆ “Workshop on Using Mplus: Factor Analysis, Path Modeling, and Structural Equation Modeling (SEM)” (Feb. 2018)

Instructor at Texas A&M University

- ◆ “Career Preparation Summer Workshop” (Jul. 2019)
- ◆ “R workshop: Getting Started with the Tidyverse” (May 2019)
- ◆ “Peer Mentoring for Interdisciplinary STEM Graduate Program” (Oct. 2017) (Oct. 2018) (Nov. 2019)
- ◆ “Creating an Individual Development Plan (IDP) - Advancing Interdisciplinary STEM Graduate Education in Energy and Sustainability Disciplines” (Feb. 2017)
- ◆ “Social Network Visualization” (Sep. 2016)

Instructor in Taiwan

- ◆ “Academic Publishing” (May 2018)
- ◆ “Data Visualization in Education” (Feb. – Jun. 2015)
- ◆ “Improving the Use of Survey Data in Decision Making of Higher Education” (Jul. – Sep. 2013)
- ◆ “Instruction of Institutional Research Analysis and Online Data Analysis System” (2010 – 2015)

Teaching Assistant in Taiwan

- ◆ “Intensive Quantitative Methods Workshop: Factor Analysis, HLM, and SEM” (2011 – 2014)

Facilitator at Texas A&M University

- ◆ “Online Workshop – Career Success and Your Individual Development Plan” (Sep. 2018)
- ◆ “D3EM Student Writing Feedback Group and ePortfolio Feedback Session” (Spring 2018 – Spring 2020)
- ◆ “D3EM Student Learning Community” (2016 – 2020)
- ◆ “D3EM Faculty Community of Scholars” (2015 – 2020)

K-12 Teaching Experience

School Teacher

- ◆ Student Teacher, Yayu Elementary School, Taiwan (Aug. 2009 – Jan. 2010)

PROFESSIONAL SERVICES

Ad Hoc Journal Reviewer

- ◆ American Educational Research Journal (Feb.– Mar. 2019)
- ◆ Science Education (Dec. 2018 – Jan. 2019)
- ◆ Teacher College Record (Nov. – Dec. 2018)
- ◆ Journal of Engineering Education (Sep.– Oct. 2018)
- ◆ Educational Researcher (Aug.– Sep. 2018)
- ◆ Journal of Latinos and Education (Mar. – Apr. 2018)
- ◆ Journal of Educational Psychology (Apr.– May 2017)

Conference Paper Reviewer

- ◆ American Society for Engineering Education (ASEE) (Nov. 2017 – Mar. 2018)
- ◆ American Educational Research Association (AERA) (Sep.– Oct. 2017)

Statistics Consultant

Educational Research and Evaluation Lab (EREL), Texas A&M University (Fall 2017 – Fall 2019)

- ◆ Consultant of statistical questions and using statistics software.
- ◆ Consultant of using large scale secondary datasets (TIMSS, ELS, HSLS) for publication

PROFESSIONAL MEMBERSHIPS

- ◆ American Educational Research Association
- ◆ American Psychological Association
- ◆ American Society for Engineering Education
- ◆ National Center for Faculty Development & Diversity (NCFDD)
- ◆ European Educational Research Association
- ◆ Chinese American Educational Research and Development Association
- ◆ Taiwan Association for Sociology of Education
- ◆ Taiwanese Local Education Development Association

WEB DEVELOPMENT

- ◆ **Chang, C. N.** (2017). An Online Individual Development Plan (IDP) for STEM minority PhD students. Template published: <https://sites.google.com/site/txarmidp/>

Application: The Texas A&M System AGEP Alliance - A Model to Advance Historically Underrepresented Minorities in the STEM Professoriate, Funded by NSF Alliances for Graduate Education and the Professoriate (AGEP) Program #1723255/1723260/1723165/1723253.

- ◆ **Chang, C. N.** (2016). Running R Scripts on Webpage to Examine the Partial Invariance Model. Online R program: <https://sites.google.com/site/partialinvarianceselection/>

Application: Lai, M. H., Kwok, O. M., Yoon, M., & Hsiao, Y. Y. (2017). Understanding the Impact of

Partial Factorial Invariance on Selection Accuracy: An R Script. *Structural Equation Modeling: A Multidisciplinary Journal*, 24(5), 783-799.

- ♦ **Chang, C. N.** (2016). Learning Portfolio for Interdisciplinary Graduate Program in Science and Engineering Fields. Template published: <https://sites.google.com/site/d3emepportfolio/>

Application: Data-Enabled Discovery and Design of Energy Materials, Funded by NSF Research Traineeship (NRT) program #1545403

STATISTICAL PROGRAM SKILLS

- ♦ Mplus, R, Stata, SPSS, HLM, IRTPRO, Radiant, EXCEL, Gephi, NodeXL, D3.js, Gapminder, OpenCPU, Google Fusion Tables

PROFESSIONAL WEBSITES

- ♦ **Google Scholar Citations:** <https://scholar.google.com/citations?user=THoddIEAAAAAJ&hl=en>
- ♦ **LinkedIn Profile:** <https://www.linkedin.com/in/imnickchang>
- ♦ **ORCID:** <https://orcid.org/0000-0003-4659-4898>