David Lang

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Education

† *Indicates expected*

2015–2020 † Ph.D., Economics of Education, Stanford University

Thesis Title: Platform Design in Educational Contexts

Advisors: Ben Domingue, Eric Bettinger, and Mitchell Stevens

2018–2020† M.S., Computer Science, Stanford University

2011–2014 M.S., Management Science and Engineering, Stanford University

2004–2008 B.S., Applied Mathematics, UCLA

2004–2008 B.A., Economics, UCLA

Employment

- (2018–Present) *Researcher*, Stanford Graduate School of Business
  - Conducted interviews regarding the XPrize competition, Adult Literacy, incentive prizes, and AI in educational settings
  - Assisted in the organization of a conference involving Market Shaping (attendees include, Hal Varian, Al Roth, Susan Athey, and other experts in the field of market design and machine learning)
  - Wrote a summative white paper of findings and conference proceedings
- (2015–Present) *PhD Candidate*, Graduate School of Education, Stanford University
  - Conducted natural language processing on text-message-based tutoring services to improve lesson quality and student engagement
  - Recruited and ran randomized controlled trials on a mobile tutoring network
  - Analyzed Stanford online course clickstream data and recommended policy and feature changes to improve student completion rates
  - Worked with San Francisco Unified School District to develop models to identify dyslexic students and predict student absences

- (2015–2018) *Partner/Consultant*, Data Dream Team Consulting LLC,
  - Worked with airlines to predict customer frequent-flier redemption
  - Cleaned and massaged a terabyte plus transactional database for preprocessing
  - Discussed and defended modelling choices with clients and financial auditors
  - Recommended changes to frequent-flier programs based on findings
- (2014–2015) *Workforce Analyst*, University of California Office of the President
  - Evaluated systemwide policies on faculty hiring committee composition and its effects on minority hiring outcomes
  - Reviewed and modeled faculty salary equity studies for all ten campuses
  - Conducted survival analysis based on UC faculty data and other data sources to predict faculty retirement
  - Conducted longitudinal analysis of faculty advancement/separation using a competing risk hazard model
- (2008–2014) *Research Analyst/Associate*, Federal Reserve Bank of San Francisco
  - Spoke to a wide range of academic, public, and professional audiences about the economic outlook and recent monetary policy decisions
  - Fact-checked President Janet Yellen's speeches
  - Used data-mining techniques to improve collections on the Treasury's billion-dollar debt portfolio on a joint project with McKinsey and the Treasury
  - Created and cleaned a variety of datasets which utilized the Consumer Expenditure Survey, McDash Mortgage Data, and other financial datasets
  - Created a data-retrieval add-in that improved productivity and saved our department several thousand dollars relative to proprietary alternatives

Publications and Conference Proceedings

[1] **Lang, D.** Stenhaug, B. Kizilcec, R. 2019. "Keystrokes, Edit Distance, and Grading Rules: Psychometric Properties of Short Answer Items." AERA 2019. (Forthcoming)

[2] Mongkhonvanit, K., Kanopka, K., **Lang, D.** (2019, March). Deep Knowledge Tracing and Engagement with MOOCs. In Proceedings of the 9th International Conference on Learning Analytics Knowledge (pp. 340-342). ACM.

[3] Benotti, L., Bhaskaran, J., Kjartansson, S., **Lang, D.** (2018). Modeling Student Response Times: Towards Efficient One-on-one Tutoring Dialogues. In Proceedings of the 2018 EMNLP Workshop W-NUT: The 4th Workshop on Noisy User-generated Text (pp. 121-131).

[4] Domingue, B. W., **Lang, D.**, Cuevas, M., Castellanos, M., Lopera, C., Mariño, J. P., ... Shavelson, R. J. (2017). Measuring student learning in technical programs: A case study from Colombia. AERA Open, 3(1), 2332858417692997.

[5] **Lang, D.**, Kindel, A., Domingue, B., Paepcke, A. (2017). Making the Grade: How Learner Engagement Changes after Passing a Course. Proceedings of Educational Data Mining. Furlong, F., **Lang, D.**, Takhtamanova, Y. (2014). Drivers of mortgage choices by risky borrowers. FRBSF Economic Letter, 01.

[6] Furlong, F. T., Takhtamanova, Y., **Lang, D**. (2014, March). Mortgage Choice in the Housing Boom: Impacts of House Price Appreciation and Borrower Type. Federal Reserve Bank of San Francisco.

[7] Hobijn, B., Krainer, J., **Lang, D**. (2011). Cap rates and commercial property prices. FRBSF Economic Letter, 2011, 29.

[8] **Lang, D.**, Lansing, K. J. (2010). Forecasting growth over the next year with a business cycle index. FRBSF Economic Letter, 2010, 29.

Presentations

- Bay Area Learning and Analytics Conference (2019). "Clickstreams, Video Engagement, and Course Performance."

- Bay Area Learning and Analytics Conference (2018). "Teacher Professional Development: Social Networks and Influence Maximization."

- Bay Area Learning and Analytics Conference (2018). "Heterogeneous Effects of Cellphone Credit Incentives on Mobile Learning in Africa."

- Center for Education Policy Analysis Alumni Research Conference, Stanford University (2018). "Air Quality Inequality: A Study of San Francisco Schools."

Research Partnerships

Yup- Yup is a text-messaged based tutoring company

- Completed Projects: Modelling Student Response Time to Tutor Questions

- Completed Projects: A randomized controlled trial evaluation of a digital whiteboard in a remote tutoring environment

- Ongoing Projects: Diffusion of teacher practice using social network analysis

- Ongoing Projects: Measuring the impact of badges and gamification in a tutoring platform

Reup- Reup is a college-coaching company that encourages students to re-enroll in college after dropping out

- Ongoing Projects: Predicting college re-enrollment using coaching transcripts and natural language processing

Eneza- Eneza is a Kenyan learning platform that provides primary and secondary education via SMS and feature phones

- Ongoing Projects: Understanding the effect of microcredit incentives in educational platforms

- Completed Projects: Predicting psychometric features of items using natural language processing

Awards

- Best Paper Award. (CS 230: Deep Learning) "Deep Knowledge and Engagement Tracing" Kanopka,K. Lang,D. Mongkhonvanit,K. (2018)

- Travel Scholarship. Berkeley Initiative for Transparency in the Social Sciences Research Transparency and Reproducibility Training (2018)

- Travel Scholarship. 21st Summer Institute in Statistical Genetics (SISG) (2015)

Code

- Deep Knowledge Tracing https://github.com/klintkanopka/dkt2

- Tutor-Response-Time Models https://github.com/davidnathanlang/cs224u-project

Skills and Programming Languages

- Expert: Stata, R, Knowledge Tracing https://github.com/klintkanopka/dkt2

- Proficient: Matlab, Python, SQL

- Novice: TensorFlow, PyTorch

Technical Skills: Social Network Analysis, Natural Language Processing, Computer Vision, Machine Learning, Causal Inference, Regression Analysis, Econometrics, and Psychometrics