# Andrés Abeliuk

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*"To explain everything is impossible: not realizing this fact
produces inhibition.", Gödel*

## Research Interests

Collective Intelligence; Computational Social Science; Game Theory; Behavioral Experiments;
Design and Analysis of Algorithms; Computational Complexity Theory; Complex Systems.

## Professional Experience

Jan 2021 -    **University of Chile**, *Assistant Professor*.
Department of Computer Science, University of Chile, Santiago, Chile

Jan 2018 -    **University of Southern California**, *Research Scientist*.
Nov 2020    Information Sciences Institute, University of Southern California, Marina Del Rey, CA

Oct 2016 -    **MIT**, *Postdoctoral Associate*.
Dec 2017    MIT's Media Lab, Scalable Cooperation Group, Cambridge, MA

## Education

2013 - 2016    **University of Melbourne**, *PhD in Computer Science*.
Optimisation Research Group, NICTA and The University of Melbourne, Australia
Thesis: *On the Predictability and Efficiency of Cultural Markets with Social influence and
Position Biases.*

2005 - 2011    **University of Chile**, *Computer Engineering (Masters Equivalent)*.
Facultad de Ciencias Físicas y Matemáticas, Santiago, Chile
Thesis: *Compressed suffix trees for highly repetitive texts.*

## Teaching Experience

Fall 2020    **Principal Lecturer**, *Foundations and Applications of Data Mining (INF 553)*, School
of Engineering, University of Southern California.

Fall 2019    **Co-Lecturer**, *Foundations and Applications of Data Mining (INF 553)*, School of
Engineering, University of Southern California.

2015-2016    **Teaching Assistant**, *Optimisation and Decision Making*, Master of Business Analytics, University of Melbourne.

## Research Grants

2019    **Understanding Online Social Influence in Diverse Populations**.
National Science Foundation, Pending

2019    **Limits of Learnability of Partially Observed Social Systems**.
Army Research Office, Pending

2019    **Understanding the Human Machine Feed-back Loop**.
National Science Foundation, Pending

## Participation in other projects as key personnel

2018-2020 **Synergistic Anticipation of Geopolitical Events**, *IARPA HFC program.*
PI: Aram Galstyan (USC)

2019-2020 **Cognitive Online Simulation of Information Network Environments**, *DARPA SocialSim program.*
PI: Emilio Ferrara (USC)

2018-2019 **Effectively Forecasting Evolving Cyber Threats**, *IARPA CAUSE program.*
PI: Kristina Lerman (USC)

## Selected Publications

### Journal Articles

2020 *Discovering patterns of online popularity from time series*, M. Ozer, A. Sapienza, A. Abeliuk, G. Muric, E. Ferrara. **Expert Systems with Applications**.

2020 *Friendship paradox biases perceptions in directed networks*, N. Alipourfard, B. Nettasinghe, A. Abeliuk, V. Krishnamurthy, K. Lerman. **Nature communications**.

2016 *Assortment optimization under a multinomial logit model with position bias and social influence*, A. Abeliuk, G. Berbeglia, M. Cebrian, P. Van Hentenryck. Quarterly Journal of Operations Research (**4OR**).

2015 *The benefits of social influence in optimized cultural markets*, A. Abeliuk, G. Berbeglia, M. Cebrian, P. Van Hentenryck. **PLOS ONE**.

2015 *Bargaining Mechanisms for One-Way Games*, A. Abeliuk, G. Berbeglia, P. Van Hentenryck. **Games**, 6(3).

2014 *Iterated crowdsourcing dilemma game*, K. Oishi, M. Cebrian, A. Abeliuk, and N. Masuda. **Scientific Reports**.

2013 *Practical Compressed Suffix Trees*, A. Abeliuk, R. Cánovas, G. Navarro. **Algorithms**.


### Refereed Archival Conferences

2020 *Challenges in Forecasting Malicious Events from Incomplete Data*, N. Tavabi, A. Abeliuk, N. Mokhberian, J. Abramson, K. Lerman. In: Proc. Int. Companion Proceedings of The 2020 World Wide Web Conference (**WWW-20**).

2020 *Physiological Signal Embeddings with Nonparametric Hidden Markov Models*, N. Tavabi, H. Hosseinmardi, J. Villatte, A Abeliuk, S. Narayanan, E. Ferrara, K. Lerman. In: Proc. Int. Conference on Social Computing, Behavioral-Cultural Modeling, & Prediction and Behavior Representation in Modeling and Simulation (**SBP-BRiMS 2020**).

2020 *How Movement and Countermovement Communities Interactions Affect Temporal Evolution of Topics: A Study on 2016 Refugee Crisis Twitter Discourse*, I. M. Choi, A. Yang, A. Abeliuk, A. Saffer. In: Proc. of 70th Annual International Communication Association Conference (**ICA 2020**).

2019 *Characterizing Activity on the Deep and Dark Web*, N. Tavabi, N. Bartley, A. Abeliuk, S. Soni, E. Ferrara, K. Lerman. In: Proc. Int. Companion Proceedings of The 2019 World Wide Web Conference (**WWW-19**).

2019 *Collaboration Drives Individual Productivity*, G. Goran, A. Abeliuk, K. Lerman, E. Ferrara. In: Proc. of the ACM on Human-Computer Interaction (**CSCW-19**).

2019 *Quantifying the Effects of Recommendation Systems*, Sunshine Chong, Andrés Abeliuk. In: Proc. of 2019 IEEE International Conference on Big Data (**Big Data-19**).

2019 *Effects of Network Structure on Subjective Preference Diversity*, Anne Lin, Andrés Abeliuk, Emilio Ferrara. In: Proc. of 2019 IEEE International Conference on Big Data (**Big Data-19**).

2018 *A computational model of commonsense moral decision making*, R. Kim, M. Kleiman-Weiner, A. Abeliuk, E. Awad, S. Dsouza, J. Tenenbaum, I. Rahwan. In: Proc. of the 2018 AAAI/ACM Conference on AI, Ethics, and Society (**AAAI-18**).

2017 *Taming the Unpredictability of Cultural Markets with Social Influence*, A. Abeliuk, G. Berbeglia, P. Van Hentenryck, T. Hogg, K. Lerman. In: Proc. Int. World Wide Web Conference (**WWW-17**).

2016 *Asymptotic Optimality of Myopic Optimization in Trial-Offer Markets with Social Influence*, A. Abeliuk, G. Berbeglia, F. Maldonado, P. Van Hentenryck. In: Proc. Int. Joint Conference on Artificial Intelligence (**IJCAI-16**).

2016 *Interdependent Scheduling Games*, A. Abeliuk, H. Aziz, G. Berbeglia, S. Gaspers, P. Kalina, N. Mattei, D. Peters, P. Stursberg, P. Van Hentenryck, T. Walsh. In: Proc. Int. Joint Conference on Artificial Intelligence (**IJCAI-16**).

2016 *Aligning Popularity and Quality in Online Cultural Markets*, P. Van Hentenryck, A. Abeliuk, F. Berbeglia, F. Maldonado, G. Berbeglia. In: Proc. Int. AAAI Conference on Web and Social Media (**ICWSM-16**).

2015 *A Bargaining Mechanism for One-Way Games*, A. Abeliuk, G. Berbeglia, P. Van Hentenryck. In: Proc. Int. Joint Conference on Artificial Intelligence (**IJCAI-15**).

2012 *Compressed Suffix Trees for Repetitive Texts*, Andrés Abeliuk and Gonzalo Navarro. In: Proc. Symposium on String Processing and Information Retrieval (**SPIRE'12**).

## Extended Abstracts / Non-Archival Proceedings

2020 *Anchor Attention for Hybrid Crowd Forecasts Aggregation*, Y. Huang, A. Abeliuk, F. Morstatter, P. Atanasov, A. Galstyan. Int. Conference on Autonomous Agents and Multiagent Systems (**AAMAS-20**).

2019 *SAGE: A Hybrid Geopolitical Event Forecasting System*, F. Morstatter, A. Galstyan, G. Satyukov, D. Benjamin, A. Abeliuk, et al. In: Proc. Int. Joint Conference on Artificial Intelligence (**IJCAI-19**).

2017 *Modeling the Evolution of Political Ideologies*, A. Abeliuk, A. Fernández Anta, N. Obradovich, I. Rahwan. In: Proc. Int. Conference on Computational Social Science (**IC2S2-17**).

2016 *Controlling Collective Behavior*, A. Abeliuk, G. Berbeglia, M. Cebrian, T. Hogg, K. Lerman, P Van Hentenryck. In: Proc. Int. Conference on Computational Social Science (**IC2S2-16**).

2014 *One-Way Interdependent Games*, A. Abeliuk, G. Berbeglia, P Van Hentenryck. In: Proc. Int. Conference on Autonomous Agents and Multiagent Systems (**AAMAS-14**).

2009 *The distribution of phenotypic size produced by fixed mutations in finite populations and changing environments*, P. Razeto-Barry, J. Díaz, A. Abeliuk, R. A. Vásquez. 150 Years of Darwin's Evolutionary Theory, Punta del Este, Uruguay.

### Under review

2020  *Quantifying Machine Influence over Human Forecasters*, A. Abeliuk, D. Benjamin, F. Morstatter, A. Galstyan. **Nature Scientific Reports** (submitted).

2020  *Predictability limit of partially observed systems*, A. Abeliuk, Z. Huang, E. Ferrara, K. Lerman. **Journal of the Royal Society Interface** (submitted).

2020  *Price of Anarchy in Algorithmic Matching of Romantic Partners*, A., Andrés K. Elbassioni, T. Rahwan, M. Cebrian, I. Rahwan. **Royal Society Open Science** (submitted).

2019  *Discovering signals from web sources to predict cyber attacks*, P. Goyal, K. Hossain, A. Deb, N. Tavabi, N. Bartley, A. Abeliuk, E. Ferrara, K. Lerman. **PLOS ONE** (submitted).

2018  *Superintelligence cannot be contained: Lessons from Computability Theory*, M. Alfonseca, M. Cebrian, A. Fernandez Anta, L. Coviello, A. Abeliuk, I. Rahwan. **Ethics and Information Technology** (submitted).

## Service and Outreach

### Organization of conferences and workshops

2019-2020  **Co-organizer**, *Datafest events as part of the Center for Knowledge-Powered Interdisciplinary Data Science (CKIDS)*, Los Angeles, CA.
https://sites.usc.edu/ckids

2019  **Co-organizer**, *Network science for social good workshop held at The Conference on Network Science, **NetSci 2019** *, Burlington, VT.
https://sites.google.com/view/netsci4sg

### Refereeing

**Journals**, INFORMS Journal on Computing 2019; Proceedings of the Royal Society 2019; Naval Research Logistics 2018; The Computer Journal 2017; European Journal of Operational Research 2017; Journal of Artificial Intelligence Research (JAIR) 2015.

**Conference Program Committee**, IC2S2 2020; ICCS 2020; KDD 2020; WebSci 2020; NERCCS2020; BDS 2020; CompleNet 2020; WSDM 2020; ASONAM 2019; WebSci 2019; WSDM 2019; ICCS 2018; IC2S2 2018; ICWSM 2018; NERCCS 2018; SocInfo 2017; SIROCCO 2017; PODC 2017; IC2S2 2017; WINE 2016; AAAI 2015..

**Grant panels**, National Science Foundation, 2020..

### Invited Talks

-*Taming the unpredictability of cultural markets with social influence,* Artificial Intelligence Research (AIR) Conference, UCLA, Los Angeles, CA, 2020

-*Algorithmic policy-making and the role of agent-based models,* Inverse Generative Social Science Workshop, Washington, DC, 2020.

-*Friendship Paradox Biases Perceptions in Directed Networks,* Dynamics On and Of Complex Networks Workshop, NetSci 2019, Burlington, VT, 2019

-*Price of Anarchy in Algorithmic Matching of Romantic Partners,* Microsoft Research New England, Boston, MA, 2017.

### Other Activities

-Member of the Institute of Philosophy and Complexity Science (IFICC).

-Teacher: Assisted local youth in preparing for college admission tests, "Preuniversitario José Carrasco Tapia", 2007-2009, Universidad de Chile.

## Other Research Experience

Nov 2015 - **University of Michigan**, *Visiting Student*.
Jan 2016   Industrial and Operations Engineering Dept., Ann Arbor, MI

## Industry Experience

Dec 2011 - **Foris**, *Software Engineer*, Santiago, Chile.
Jan 2013   - Class timetable scheduling using genetic algorithms.
           - Natural language processing.
Dec 2010 - **GPI Ingenieros Consultores**, *Consultant Engineer*, Santiago, Chile.
Nov 2011   Optimization of employee timetabling for a pharmacy chain (FASA),