

## Education

- 2015 **PhD**, *Carnegie Mellon University*, Pittsburgh.  
February Computational Biology/ School of Computer Science  
**Dissertation:** *Inferring And Analyzing The Present And The Past Of Networks From Limited Information*  
**Advisor:** Prof. Carl Kingsford **Committee:** Russell Schwartz, Seyoung Kim, Guy E. Blelloch
- 2011 **M.S.**, *University of Maryland*, College Park.  
Computer Science
- 2008 **BEng**, *Bogazici University*, Istanbul, GPA – 3.8/4.0 (Ranked #1 in class).  
Computer Engineering

## Current Interests

Data Mining Applications in Finance, Bioinformatics, Social Networks, Machine Learning

## Work Experience

### Ozyegin University, Computer Science Department

Istanbul

2020 Sep - **Assistant Professor**.  
Present

### J.P. Morgan Chase, CIB

New York City

- 2020 Mar - **AI & Applied ML Researcher, Lead**.  
2020 Sep
  - Develop algorithms to detect fraudulent activities in market-making & trading through time-series analysis
  - Develop techniques to identify entitlement anomalies through interaction graph analysis

### Goldman Sachs Asset Management, IMD

New York City

- 2018 Jan - **Vice President, Quantitative Strategist. Fundamental Equity (FE), \$60 billion mutual fund**.  
2019 Nov
  - Generated over 1.5 Sharpe signal on supply-chain dataset for biweekly-rebalanced quantamental fund
  - Developed optimal hierarchical portfolio construction for \$5 billion Exchange Fund, by backtesting historical inflows
  - Increased annual Exchange Fund inflow to \$1 billion, by developing rule-based framework to decide stock acceptance under 3 seconds
  - Designed & led the whole IMD Exchange Fund portfolio construction project

2015 Dec - **Associate, Quantitative Strategist. Goldman Sachs Investment Partners (GSIP), flagship multistrategy hedge fund**.  
2018 Jan
  - Developed systematic allocation strategies for Event driven fund by backtesting merger data
  - Developed volatility trading strategies for Chinese market through index options
  - Developed min-cost replication & hedging algorithms to rebalance \$1 billion Liquid Alt. funds under 2 minutes
  - Responsible for risk management of \$4 billion hedge fund

### CMU, School of Computer Science

Pittsburgh

- 2015 Mar - **Machine Learning Postdoctoral Researcher**, CARNEGIE MELLON UNIVERSITY.  
Dec
  - Focused on time-series analysis of lung development with Ziv Bar-Joseph at CMU Machine Learning Department
  - Examined the tradeoffs between dense and replicate sampling strategies for high-throughput time series experiments

2011-2015 **Research / Teaching Assistant**, CARNEGIE MELLON UNIVERSITY.
  - Developed a method to deconvolve ensemble chromatin interaction data in cell subpopulations
  - Developed convex optimization-based method to predict information diffusion history over social network
  - Developed linear optimization-based approach to predict information diffusion network
  - Led recitation hours, and graded exams in 02-713: Algorithms & Data Structures for Scientists course

### University of Maryland, School of Computer Science

College Park

- Developed MRF-based method to predict protein annotation with provably optimal guarantees
- Developed unsupervised tree-based method to reconstruct species interaction network history
- Led recitation hours, and graded exams in CMSC 131, CMSC 433, CMSC 423 courses

---

## Publications

### Journal Publications

- [1] **Emre Sefer**. Joint Modeling of Epigenome and Transcriptome Effects in 3D Genome. IEEE/ACM Transactions on Computational Biology and Bioinformatics, Under Review 2021
- [2] **Emre Sefer**. Hi-C Interaction Graph Analysis Reveals the Impact of Histone Modifications in Chromatin Shape. Applied Network Science, Invited 2021
- [3] **Emre Sefer** and Carl Kingsford. Metric Labeling and Semi-metric Embedding for Protein Annotation Prediction. Journal of Computational Biology, 2021
- [4] **Emre Sefer** and Carl Kingsford. Semi-nonparametric Modeling of Topological Domain Formation From Epigenetic Data. Algorithms for Molecular Biology 14 (1), 4. 2019
- [5] M Kleyman, **Emre Sefer**, Nicola, T., Espinoza, C., Chhabra, D., Hagood, J. S., Kaminski, N., Ambalavanan, N., and Ziv Bar-Joseph. Selecting the most appropriate time points to profile in high-throughput studies. eLife Sciences 2017
- [6] **Emre Sefer**, M Kleyman, and Ziv Bar-Joseph. Tradeoffs between Dense and Replicate Sampling Strategies for High-Throughput Time Series Experiments. Cell systems 3 (1), 35-42. 2016
- [7] **Emre Sefer**, Geet Duggal, and Carl Kingsford. Deconvolution Of Ensemble Chromatin Interaction Data Reveals The Latent Mixing Structures In Cell Subpopulations. Journal of Computational Biology 23 (6), 425-438. 2016
- [8] **Emre Sefer** and Carl Kingsford. Diffusion Archaeology for Diffusion Progression History Reconstruction. Knowledge and Information Systems 2016(2):530-539
- [9] Geet Duggal, Rob Patro, **Sefer, Emre**, Hao Wang, Darya Filippova, Samir Khuller, and Carl Kingsford. Resolving spatial inconsistencies in chromosome conformation measurements. Algorithms for Molecular Biology, 8(1):8, 2013
- [10] Rob Patro, **Emre Sefer**, Justin Malin, Guillaume Marcais, Saket Navlakha, Carl Kingsford. Parsimonious reconstruction of network evolution. Algorithms for Molecular Biology 2012 7:25

### Conference Publications with Proceedings (Refereed)

- [1] **Emre Sefer**. Joint Modeling of Histone Modifications in 3D Genome Shape Through Hi-C Interaction Graph. Complex Networks 2020
- [2] **Emre Sefer**, and Ziv Bar-Joseph. Shall we dense? Comparing design strategies for time series expression experiments\*. RECOMB 2016, **\*Winner of the Best Paper Award**
- [3] **Emre Sefer**, Geet Duggal, and Carl Kingsford. Deconvolution Of Ensemble Chromatin Interaction Data Reveals The Latent Mixing Structures In Cell Subpopulations. RECOMB 2015
- [4] **Emre Sefer** and Carl Kingsford. Convex Risk Minimization To Infer Networks From Probabilistic Diffusion Data At Multiple Scales. ICDE 2015
- [5] **Emre Sefer** and Carl Kingsford. Semi-nonparametric Modeling of Topological Domain Formation From Epigenetic Data. WABI 2015
- [6] **Emre Sefer** and Carl Kingsford. Diffusion Archaeology for Diffusion Progression History Reconstruction. ICDM 2014
- [7] Geet Duggal, Rob Patro, **Sefer, Emre**, Hao Wang, Darya Filippova, Samir Khuller, and Carl Kingsford. Resolving spatial inconsistencies in chromosome conformation measurements. WABI 2012

- [8] Robert Patro, Geet Duggal, **Emre Sefer**, Hao Wang, Darya Filippova, and Carl Kingsford. The missing models: a data-driven approach for learning how networks grow\*. KDD 2012, **\*Winner of Best Video Award**
- [9] Rob Patro, **Emre Sefer**, Justin Malin, Guillaume Marcais, Saket Navlakha, Carl Kingsford. Parsimonious reconstruction of network evolution. WABI 2011
- [10] Robert Gove, Nick Gramsky, **Emre Sefer**, Ben Shneiderman. NetVisia: Heat map & matrix visualization of dynamic social network statistics & content. SocialCom 2011
- [11] **Emre Sefer** and Carl Kingsford. Metric labeling and semi-metric embedding for protein annotation prediction. RECOMB 2011
- [12] Dana Nau, **Emre Sefer**, Ugur Kuter. Thinking ahead in real-time search. ICAPS 2009
- [13] **Emre Sefer**, Ugur Kuter, Dana Nau. Real-time A\* search with depth-k lookahead. International Symposium on Combinatorial Search, SoCS 2009

#### Journal & Conference Abstracts with Proceedings

- [1] Teodora Nicola, **Emre Sefer**, et al. Identification Of Optimal Time Points And Proteomic Profiling During Murine Lung Alveolar Septation [abstract]. American Journal of Respiratory and Critical Care Medicine 2016;193:A6561
- [2] C. R. Espinoza, D. Chhabra, T. Nicola, N. Ambalavanan, N. Kaminski , **Emre Sefer** , Z. Bar-Joseph, J. S. Hagood. Dynamic Changes of DNA Methylation During Different Stages of Normal Mouse Lung Development [abstract]. American Journal of Respiratory and Critical Care Medicine 2016;193:A2344

## Invited Talks & Tutorials

#### Peer-reviewed Conference Presentations

- Joint Modeling of Histone Modifications in 3D Genome Shape Through Hi-C Interaction Graph. Complex Networks 2020, Madrid, Spain. 02/12/2020
- Shall we dense? Comparing design strategies for time series expression experiments. RECOMB 2016, Los Angeles, USA. 10/04/2016
- Semi-nonparametric Modeling of Topological Domain Formation From Epigenetic Data. WABI 2015, Atlanta, USA. 15/09/2015
- Deconvolution Of Ensemble Chromatin Interaction Data Reveals The Latent Mixing Structures In Cell Subpopulations. RECOMB 2015, Warsaw, Poland 18/04/2015
- Convex Risk Minimization To Infer Networks From Probabilistic Diffusion Data At Multiple Scales. ICDE 2015, Seoul, South Korea. 12/04/2015
- Diffusion Archaeology for Diffusion Progression History Reconstruction. ICDM 2014, Shenzhen, China. 18/12/2014
- Metric labeling and semi-metric embedding for protein annotation prediction. RECOMB 2011, Vancouver, Canada. 10/04/2011
- Real-time A\* search with depth-k lookahead. International Symposium on Combinatorial Search. SoCS 2009, Los Angeles, USA. 14/08/2009

#### Tutorials

- Finding Topological Domains in Genome. ACM-BCB 2015, Atlanta, USA. 12/09/2015

#### Special Invited Talks

- Analyzing The Present And The Past Of The Networks From Limited Information. Ozyegin University Computer Science Department, Istanbul, Turkey. 14/04/2020
- Analyzing The Present And The Past Of The Networks From Limited Information. Istanbul Technical University, Faculty of Computer Engineering, Istanbul, Turkey. 04/04/2020

- Analyzing The Present And The Past Of The Networks From Limited Information. Yeditepe University, Computer Engineering Department, Istanbul, Turkey. 27/03/2020
- Analyzing The Present And The Past Of The Networks From Limited Information. Kadir Has University Computer Science Department, Istanbul, Turkey. 20/03/2020
- Deconvolution Of Ensemble Chromatin Interaction Data Reveals The Latent Mixing Structures In Cell Subpopulations. Ziv-Bar Joseph's Systems Biology Research Group at CMU Machine Learning Department, Pittsburgh, PA. 14/02/2015

## Posters

- Convex Risk Minimization To Infer Networks From Probabilistic Diffusion Data At Multiple Scales. GLBIO 2015, Pittsburgh, USA. 12/04/2015
- Real-time A\* search with depth-k lookahead. International Symposium on Combinatorial Search. SoCS 2009, Los Angeles, USA. 14/08/2009

## Professional Contributions

- Gave **tutorial** about topological domains in 3D genome at ACM-BCB 2015
- Served as a **Program Committee Member** for ACM-BCB 2015
- Serve as a **Program Committee Member** for IJCAI 2021
- Worked as a part of NIH funded **LungMAP** project to map lung dynamics (<https://www.lungmap.net/>)
- Reviewed papers for RECOMB 2012, RECOMB 2013, RECOMB 2014, RECOMB 2015, ISMB 2012, ISMB 2014, WABI 2015, ACM-BCB 2015 conferences
- Reviewed papers for Genome Research, Bioinformatics, BMC Bioinformatics, Journal of Computational Biology, Nucleic Acids Research, IEEE Transactions on Computational Biology and Bioinformatics, Optimization Letters journals

## Teaching Experience

### Assistant Professor,

OZYEGIN UNIVERSITY.

- Fall, 2020. CS 201: Data Structures and Algorithms
- Spring, 2021. CS 333: Algorithms Analysis
- Spring, 2021. CS 440/540: Machine Learning in Finance

### Teaching Assistant,

CARNEGIE MELLON UNIVERSITY.

- Spring, 2014. CMU 02-713: Algorithms & Data Structures for Scientists

### Teaching Assistant,

UNIVERSITY OF MARYLAND.

- Fall, 2008. CMSC 131: Object Oriented Programming
- Fall, 2010. CMSC 423: Bioinformatics
- Spring, 2012. CMSC 433: Programming Language Technologies and Paradigms

## Other Achievements

- Received **Best Paper Award** at RECOMB 2016
- Received University of Maryland Computer Science Fellowship during graduate studies
- Graduated from Bogazici University in the **1st** rank with High Honors
- Received Bogazici University Full Scholarship during undergraduate studies
- Received **Best Video Award** at KDD 2012 conference [techtalks.tv/talks/57076/](https://techtalks.tv/talks/57076/)
- Received fellowships for RECOMB 2011, RECOMB 2015, ICDM 2014, ICDE 2015, ICAPS 2009 conferences
- Ranked 394th among 1.500.000 people in Turkey University Entrance Exam (OSS)

- Ranked 17th among 100.000 people in Turkey Graduate Education Test (ALES) 2008

## Computer skills

Advanced PYTHON, SLANG/SECDB (Goldman Sachs' proprietary language), Optimization Software (AXIOMA, CPLEX, GUROBI, AMPL, IMSL)

Intermediate C++, MATLAB, R, SQL, SPARK