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Soheil Eshghi

Appointments

2020-Current Engagement Manager, ***McKinsey & Company***, Philadelphia, PA

I am a Life Sciences Engagement Manager serving companies (pharma, biotech, medtech) primarily on strategy - sample impact below:

[Pharma and Biotech]

- Established strong partnership with CEO of a $5 billion biotech, serving them over 5 engagements and leading 2 major initiatives, including: designing an ex-US go-to-market strategy and operating model for a rare disease therapy launch, the First in their history; assisting in setting investor expectations for a second-to-market late-stage rare-disease therapy in advance of trial results; and conducting due diligence assessments for 3 potential acquisitions in the infectious disease, respiratory, and nephrology spaces
- Led a team of 3 to refresh the DnA strategy of a top-30 Pharmaco, redefining vision and prioritizing use cases with ELT input
- Conducted wargaming exercises with N-1 / N-2 of a VaccineCo, helping revise their long-term mRNA vaccine strategy
- Assisted a PE client in evaluating an asset in the clinical trial operations space (stroke-of-pen risk due diligence)

[Medtech]

- Collaborated with the division president and senior stakeholders to orchestrate the largest medical device recall in history (∼5.5M devices) as part of the First team on the ground to reconcile devices and prepare a regulatory response
- Worked with the CEO and division heads of a $2 billion medtech conglomerate to redefine corporate strategies of 5 divisions, clarifying opportunities in pathology (especially around digital pathology) and laying out strategic options for the diabetes division
- Served CEO of medtech company exploring portfolio reorganization and other strategic options in advance of an IPO
- Supported a leading distributor in creating a Global Business Services plan and in negotiating with vendors to implement the plan

[Firm leadership]

- Led a 5-member team reimagining McKinsey's Analytics offerings in Life Sciences R&D, evaluating capabilities, market landscape and strategic opportunities, successfully aligning 20 senior stakeholders around a revised vision and prioritization for the initiative
- Marshaled a team revising the structure and operations of McKinsey's Life Sciences practice, working closely with global leadership
- Helmed a 4-member team codifying data landscape and analytics opportunities offered by the McKinsey Life Sciences Data CoE
- Served on the team standing up the McKinsey Health Institute (MHI), McKinsey's second ever non-profit research arm, driving the setting of MHI's aspiration (45 billion years lived in better health globally by 2035), and launching a 16,000-respondent, 9-language survey of employee mental health in 15 countries
- Led Philadelphia Office Social responsibility initiatives (Day of Service, McKinsey Grants program for local nonprofits) for 2 years

2018–2020 Postdoctoral Associate, ***Yale School of Public Health***, New Haven, CT
With Prof. Forrest Crawford, I developed mathematical models to improve vaccination schedules and contact-tracing policies in combating epidemics, and modeled hospital dynamics in response to the COVID-19 pandemic in coordination with YNHH leadership.

2016–2018 Postdoctoral Associate, ***Yale Institute for Network Science***, New Haven, CT
With Prof. Leandros Tassiulas, I developed tools to target strategic interventions in social groups for the IBM/ARL International Technology Alliance in in Distributed Analytics and Information Sciences (DAIS ITA) and helped write grants to the ARL, ARO, and NIH.

2015–16 Postdoctoral Associate, ***ECE Dept., Cornell University***, Ithaca, NY
With Profs. Qing Zhao & Lang Tong, I derived optimal coordinated influence control policies for the ARL Network Science Collaborative Technology Alliance (NS-CTA) and co-wrote a book on charge scheduling of electric vehicles.

2011–15 Research Assistant, ***ESE Dept., University of Pennsylvania***, Philadelphia, PA
Under the supervision of Profs. Saswati Sarkar & Santosh Venkatesh, I conducted research on the optimal control of epidemics, with applications to epidemiology, network security, and delay-tolerant network message delivery.

Summer 2014 Research Intern, ***EM Dept., NEC Labs America (NECLA)***, Cupertino, CA
With Dr. Rakesh M. Patil, I proposed optimal stochastic smart-grid management policies focused on pricing grid-scale batteries (1 paper, 1 patent application, 1 invention record).

Education

2011–15 PhD **University of Pennsylvania**, *Electrical & Systems Engineering*

Thesis: Optimal Control of Epidemics in the Presence of Heterogeneity
I showed how heterogeneity affects epidemic spread, and is critical to control efforts.
Committee: **Saswati Sarkar**, S. Venkatesh, G. Pappas, V. Preciado, O. Milenkovic (UIUC)

2011–13 MSc **University of Pennsylvania**, *Electrical Engineering*, .

2006–10 BSc **Sharif University of Technology (IRI)**, *Electrical Engineering*

Awards

Feb. 2017 **Third Place**, *Datahack*, Yale Institute for Network Science, New Haven, CT.

Feb. 2016 **Fellowship ($2,500)**, *NYC ASCENT*, Cornell University, Ithaca, NY.

Mar. 2015 **Runner Up ($5,000)**, *Fels National Public Policy Challenge*, Philadelphia, PA.

Mar. 2015 **Winner ($5,000)**, *Penn Public Policy Challenge*, Philadelphia, PA.

Oct. 2010 **PhD Research Fellowship**, *University of Pennsylvania*, Philadelphia, PA.

Jun. 2006 **Best combined result in Iranian national university entrance exam history:**

- **1^{st}/600,000**, Azad Math-Physics,
- **15^{th}/400,000**, National Math-Physics,
- **1^{st}/250,000**, National Foreign Langs.

This led to awards from Iran's President, and Ministers of Education, and Higher Education, as well as a **scholarship** from the Iranian National Elite Foundation.

Media coverage

COVID-19 hospital capacity model

- Yale School of Medicine, "COVID-19: Collaborating Across Institutions"
- Yale University, "Research, clinical, and data-driven responses to COVID-19"
- Yale School of Public Health, "Research and Practice (Infectious Diseases)"

Dynamic surveillance and contact-tracing policies for outbreaks

- INFORMS 2019 blog, "Healthcare Modeling and Optimization VIII"

Entrepreneurial and volunteer experience

2014–16 **Founder and Advisor**, *SmartTrack*, Philadelphia, PA

- As part of a pro-bono student project at the University of Pennsylvania, and in collaboration with stakeholders, I helped develop an app-based solution for managing inventory (e.g., textbooks) for large, low-income school districts such as the School District of Philadelphia.
- We won the Penn Public Policy Challenge, and placed second nationally ($5K prize each).
- Our work has been featured in numerous publications, including *Governing* magazine.
- We were one of 9 out of 300 teams accepted to EDSi accelerator at Penn.
- Our solution is being used in Camden public schools and Philadelphia charter schools.
- We have raised over $125,000 in total.

2015–16 **VP of Education**, *Cornell Graduate Consulting Club*, Ithaca, NY

- I created & curated a 7 event series for 12 select participants to improve consulting skills.
- I led a team of 6 students to devise a marketing plan for a local mobile tourism startup.

2014–15 **Co-chair**, *Penn Graduate Case Competition*, Philadelphia, PA

- I organized the logistics, client selection, case creation, and sponsorship with my team of 5 and MC'ed the event.
- We out-raised our max cost projections by 110% and increased diversity of participants.
- The winning proposal was implemented by client within 3 months.

2014 **Convener**, *Penn ESE PhD Student Colloquium*, Philadelphia, PA

Memberships IEEE (2008–2021), IEEE Control Systems Society (2014–2021)

Software

COVID-19 hospital capacity model, *https://forrestcrawford.shinyapps.io/covid19_icu/*

- Led the creation and implementation of a planning tool for hospital capacity expansion planning in response to COVID-19, initially for and in coordination with Yale New Haven Hospital (with M. Erlendsdottir, M. Thayer Phillips, S. Iloglu, C. Testa and F.W. Crawford)
- Code: https://github.com/fcrawford/covid19_icu

Journal publications

Under Preparation (Last Draft)

[1] (2021) **Eshghi, S.,** Khuda Bukh, W.R., Kenah, E., Rempala, G.A., Crawford, F.W., *Dynamic surveillance and contact-tracing policies for outbreaks*

[2] (2021) Erlendsdottir, M., **Eshghi, S.**, Crawford., F.W., *Modeling Covid-19 care capacity in a major health system*, MedRXiv, https://doi.org/10.1101/2021.11.18.21266407.

[3] (2020) **Salomon, J.A.,** COVID-19 Statistics, Policy modeling and Epidemiology Collective (C-SPEC), *Defining high-value information for COVID-19 decision-making*, MedRXiv, https://doi.org/10.1101/2020.04.06.20052506.

Published

[6] **L-CSS-19** Papakostas, D., **Eshghi, S.,** Katsaros, D., Tassiulas, L., *Distributed algorithms for multi-layer connected edge-dominating sets*, IEEE Control Systems Letters (L-CSS), 3(1), 31-36, 2019.

[5] **TNSE-18** **Eshghi, S.,** Preciado, V.M., Sarkar, S., Venkatesh, S.S., Zhao, Q., D'Souza, R., Swami, A., *Spread, then target, and advertise in waves: optimal budget allocation across advertising channels*, IEEE Transactions on Network Science & Engineering, 7(2), 750-763, 2020.

[4] **ADHOC-18** Katsaros, D., Papakostas, D., **Eshghi, S.,** Tassiulas, L., *Energy-efficient backbone formation in military multi-layer ad-hoc networks*, Ad Hoc Networks journal, 81, 17-44, 2018.

[3] **TAC-17** **Eshghi, S.,** Sarkar, S., Venkatesh, S.S., *Visibility-aware optimal contagion of malware epidemics*, IEEE Transactions on Automatic Control, 62(10), 5205-5212, 2017.

[2] **ToN-16** **Eshghi, S.,** Khouzani, M., Sarkar, S., Venkatesh, S.S., *Optimal patching in clustered epidemics of malware*, IEEE Transactions on Networking , 24(1), 283-298, 2016.

[1] **TAC-15** **Eshghi, S.,** Khouzani, M., Sarkar, S., Shroff, N., Venkatesh, S.S., *Optimal energy-aware DTN epidemic routing*, IEEE Transactions on Automatic Control , 60(6), 1554-1569, 2015.

Conference publications

Published (Peer-Reviewed Conferences)

[13] **ACC-19** Papakostas, D., **Eshghi, S.,** Katsaros, D., Tassiulas, L., *Energy-aware distributed edge domination of multilayer networks*, 2019 American Control Conference

[12] CAOS-19 **Eshghi, S.,** Maghsudi, S., Restocchi, V., Salisbury, E., Stein, S., Tassiulas, L., *Efficient influence maximization Under partial network visibility*, 2019 IEEE Infocom Workshop on the Communications and Networking Aspects of Social Networks

[11] **CDC-18** Papakostas, D., **Eshghi, S.,** Katsaros, D., Tassiulas, L., *Distributed algorithms for multi-layer connected edge-dominating sets*, 2019 IEEE Conference on Decision and Control

[10] **CDC-18** **Eshghi, S.,** Tassiulas, L., *Whistleblowing games in networks*, 2019 IEEE Conference on Decision and Control

[9] **CISS-18** **Eshghi, S.,** Tassiulas, L., *Innovation, cheating, and whistleblowing - a game theoretic perspective*, 2018 Annual Conference on Information Sciences and Systems

[8] SPIE S+D-18 Bellamy, R., Colombo, G., **Eshghi, S.**, de Mel, G., Giammanco, C., Morris, R., Rand, D.G., Turner, L.D., Whitaker, R.M., Williams, G.R., *A computational framework for modelling inter-group behaviour using psychological theory*, 2018 SPIE Security + Defense

[7] **Allerton-17** **Eshghi, S.,** Williams, G.R., Colombo, G.B., Turner, L.D., Rand, D.G., Whitaker, R.M., Tassiulas, L., *Social group stability and fracture*, 2017 Annual Allerton Conference on Communication, Control, and Computing

[6] SocInf-17 Stein, S., **Eshghi, S.,** Maghsudi, S., Tassiulas, L., Bellamy, R.E., Jennings, N.R., *Heuristic algorithms for influence maximization in partially observable social networks*, 2017 International Workshop on Social Influence Analysis

[5] DAIS-17 **Eshghi, S.,** Williams, G.R., Colombo, G.B., Turner, L.D., Rand, D.G., Whitaker, R.M., Tassiulas, L., *Mathematical models for social group behavior*, 2017 Workshop on Dist. Analytics InfraStructure and Algorithms for Multi-Org. Federations

[4] DAIS-17 Stein, S., **Eshghi, S.,** Maghsudi, S., Tassiulas, L., Bellamy, R.E., Jennings, N.R., *Influence maximisation beyond organisational boundaries*, 2017 Workshop on Dist. Analytics InfraStructure and Algorithms for Multi-Org. Federations

[3] KSCO-17 Mott, D., Kelley, T., Giammanco, C., **Eshghi, S.,** Zhang, Y., *A framework for modelling the effect of emotion on uncritical reasoning*, 2017 Workshop on Knowledge Systems for Coalition Operations

[2] **ACC-15** **Eshghi, S.,** Patil, R.M., *Optimal battery pricing and energy management for microgrids*, 2015 American Control Conference

[1] **Mobihoc-12** Khouzani, M., **Eshghi, S.,** Sarkar, S., Shroff, N., Venkatesh, S.S., *Optimal energy-aware epidemic routing in DTNs*, 2012 IEEE/ACM International Symposium on Mobile Ad Hoc Networking and Computing **(Acceptance rate = 20%)**

Published (Posters & Invited Conferences)

[9] **JSM-20** **Eshghi, S.,** Crawford, F.W., *Dynamic policy counterfactuals: evaluating contact-tracing in the EVD outbreak in Liberia 2014-15*, 2020 Joint Statistical Meetings

[8] CRCS RS-20 **Eshghi, S.,** Crawford, F.W., *Optimizing dynamic surveillance and contact-tracing policies for acute outbreaks, with application to the EVD outbreak in Liberia 2014-15*, 2020 Harvard CRCS Rising Stars Workshop

[7] **INFORMS-19** **Eshghi, S.,** Khuda Bukh, W.R., Kenah, E., Rempala, G.A., Crawford, F.W., *Dynamic surveillance and contact-tracing policies for outbreaks*, 2019 INFORMS Annual Meeting

[5] YaleDoD-17 **Eshghi, S.,** Tassiulas, L., *Efficient dynamic centrality metrics for election advertising - a case study*, 2017 Yale Day of Data, Poster

[4] ComNet-17 **Eshghi, S.,** Maghsudi, S., Restocchi, V., Stein, S., Tassiulas, L., *Heuristic algorithms for influence maximization in partially observable social networks*, 2017 International Conference on Complex Networks and their Applications, Poster

[3] **ITA-17** **Eshghi, S.,** Preciado, V.M., Sarkar, S., Venkatesh, S.S., Zhao, Q., D'Souza, R., Swami, A., *Spread, then target, and advertise in waves: optimal capital allocation across advertising channels*, 2017 Information Theory and Applications Workshop

[2] **ITA-15** **Eshghi, S.,** Sarkar, S., Venkatesh, S.S., *Visibility-aware contagion of malware epidemics*, 2015 Information Theory and Applications Workshop

[1] **ITA-12** Khouzani, M., **Eshghi, S.,** Sarkar, S., Venkatesh, S.S., *Optimal patching in clustered epidemics of malware*, 2012 Information Theory and Applications Workshop

Patent applications

[1] Patil, R.M., Sharma, R., **Eshghi, S.**, *Optimal battery pricing and energy management for microgrids*, Patent no. 20160093002, Application no. 14/845412, (Abandoned).

Invited talks

[1] **Dynamic surveillance and contact-tracing policies for outbreaks**

2019 ○ **Yale University,** YINS Summer Seminar

[2] **Dynamic control of spreading processes on networks**

2019 ○ **Yale University,** YINS Colloquium

[3] **Whistleblowing**

2018 You scratch my back, and (maybe) I'll scratch yours: whistleblowing games on networks
○ **Yale University**, YINS Summer Seminar

[4] **Social Influence**

2018 Decision-making tools for influence propagation in social systems
○ **University of Michigan**, EECS (Communication & Signal Processing Seminar)
Social influence maximization: a synthesis
○ **Yale University**, YINS (Human Nature Lab)

2017 Influence in social systems
- **Yale University**, YINS Summer Seminar

[5] **Optimal control of epidemics in the presence of heterogeneity**

2018 - **Yale University**, Public Health (Crawford Lab)
2016 - **Harvard University**, Public Health (Ctr for Communicable Disease Dynamics)
- **Georgetown University**, Biology (Bansal Lab)
- **University of Georgia**, Biology (Rohani Lab)
- **Penn State University**, Biology (Ctr for Infectious Disease Dynamics)
- **Yale University**, YINS Summer Seminar
- **University of Pennsylvania**, ESE (Complex Systems Group)

2015 - **Cornell University**, ECE
2013 - **University of Pennsylvania**, ESE PhD Colloquium

Computer skills

Proficient: C/C++ ▪ R ▪ Alteryx ▪ MATLAB (Simulink, CVX, GPOPS, DIDO)

Teaching certificates

2017 **Expressing Your Enthusiasm: an Oral Communication Workshop for STEM Graduate Students and Postdocs**, *Yale University*
5-workshop series on effectively communicating research to a lay audience

2016 **Building Mentoring Skills for an Academic Career**, *Cornell University*
6-workshop series exploring various aspects of mentoring relationships in academia

2014 **Course in College Teaching**, *University of Pennsylvania*
Set of 10 hands-on teaching workshops focused on active learning and student engagement

Teaching assistantships

Cornell Markov Decision Processes (graduate), Digital Signal Processing
Penn Fourier Analysis, Digital Signal Processing (graduate)
Sharif EE Principles, Logic & Analog Circuits, Computer Structure, Microprocessors Lab

Service

PC Member: - AAAI-2020, PRIMA-2019, AAMAS-2019, AAAI-2019, AAMAS-2018

Organizer: - Yale Law Doctoral Scholarship Conference (Network Theory and Policy track)

Journal Reviewer:

IEEE Transactions on:
- Automatic Control (TAC)
- Control of Networked Systems (TCNS)
- Inf. Forensics & Security (TIFS)
- Information Theory (T-IT)
- Mobile Computing (TMC)
- Networking (ToN)
- Network Science & Eng. (TNSE)
- Wireless Communications (TWC)

Other:
- Automatica
- PLOS Computational Biology
- PLOS One
- Epidemiology and Infection
- ASME J. of Dynamic Systems (J-DS)
- IEEE Communication Letters
- IEEE Control Systems Letters (L-CSS)
- IEEE Access
- Social Net. Analysis & Mining (Springer)
- Performance Evaluation (Elsevier)

Conferences: WiOpt'16, MIM'16, NetSciCom'17, IFAC World Congress'17, CDC '18, CDC '19

Selected coursework – graduate

Optimization	Optimal Control, Dynamic Programming, Convex Optimization, Adv. Algorithms
Probability	Eng. Probability, Adv. Probability, Stochastic Processes, Random Process Models
Economics	Game Theory, Dynamic Games & Social Learning, Information Theory, Estimation
Networks	Dist. Dynamic Systems, Network Theory, EE Infrastructure, Green Buildings

Selected coursework – undergraduate

Control	Linear Control Systems, Linear Algebra, Numerical Methods
Mathematics	Engineering Mathematics, Ordinary Differential Equations, Probability
Signals	Speech Processing, Digital Signal Processing & Lab, Signals & Systems
Coding	C++ Programming, Machine Language & Architecture, Microprocessors
Networks	Wireless Communication, Digital Communication & Lab, Traffic Control
Energy	Power Systems Analysis, Electrical Machines (I, II, & Lab), Fields and Waves

Academic References

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