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Hosein Mohimani

Employment

February 2015 - Present **Scientist, Department of Computer Science and Engineering, University of California, San Diego**, *As an independent scientist at UCSD, I work on computational metagenomics and metabolomics approaches for understanding the function of microbiome and antibiotic discovery. I directed a US-Russian research group of bioinformaticians working on antibiotics discovery..*

August 2013 - February 2015 **Bioinformatics Scientist, Advanced research department, Illumina Inc., San Diego**, *As a bioinformatics scientist at Illumina, I developed statistical and algorithmic methods for analyzing next generation sequencing data..*

Education

Fall 2008 - Fall 2013 **PhD in Communication Theory and Systems, Department of Electrical and Computer Engineering**, *University of California, San Diego.*

Advisor: Prof. Pavel Pevzner

Fall 2003 - Fall 2008 **B.Sc. in dual degrees, Mathematical Science and Electrical Engineering**, *Sharif University of Technology, Tehran, Iran.*

Research Experience

- **Antibiotic Discovery.** During my Ph.D., I developed big data approaches for discovering antibiotics from metagenomics and metabolomics data.
- **Microbiome Analysis.** As a scientist at UC San Diego, and in collaboration with Professor Dorrestein (Skaggs School of Pharmacy) and Professor Knight (Department of Pediatrics), I developed statistical and computational techniques for analyzing large scale metabolomics and metagenomics datasets with the goal of understanding the function of microbiome and how it is related to disease.
- **Long Reads Technology.** As a bioinforamtic scientist at Illumina Inc., I developed algorithms for analyzing data from the new emerging synthetic long reads (SLR) technology, and a proprietary nanopore technology.
- **Compressed Sensing.** As a bachelor student, I developed approaches for sparse signal recovery in compressed sensing.

Journal Papers

- **Hosein Mohimani**, Alexey Gurevich, Alla Mikheenko, Neha Garg, Louis-Felix Nothias, Akihiro Ninomiya, Kentaro Takada, Pieter C. Dorrestein, Pavel A. Pevzner, *Dereplication of Peptidic Natural Products Through Database Search of Mass Spectra*, Nature Chemical Biology, 2016, doi : 10.1038/nchembio.2219.
- Ming Wang et. al. including **Hosein Mohimani**, *Sharing and community curation of mass spectrometry data with Global Natural Products Social Molecular Networking*, Nature Biotechnology, 2016, 34, 828-837.
- **Hosein Mohimani** and Pavel A. Pevzner, *Dereplication, Sequencing and Identification of Peptidic Natural Products: from Genome Mining to Peptidogenomics to Spectal Networks*, Nat Prod Rep, 2016, 33, 73-86.

- **Hosein Mohimani**, Wei-Ting Liu, Roland Kersten, Bradley Moore, Pieter C. Dorrestein, and Pavel A. Pevzner, *NRPquest: Coupling Mass Spectrometry and Genome Mining for Nonribosomal Peptide Discovery*, Journal of Natural Products, 2014, 77, 1902–1909.
- **Hosein Mohimani**, Roland D. Kersten, Wei-Ting Liu, Mingxun Wan, Samuel O. Purvine, Si Wu, Heather M. Brewer, Ljiljana Pasa-Tolic, Nuno Bandeira, Bradley S. Moore, Pavel A. Pevzner, and Pieter C. Dorrestein, *Automated Genome Mining of Ribosomal Peptide Natural Products*, ACS Chemical Biology, 2014, 9, 1545–1551.
- **Hosein Mohimani**, Sangtae Kim, and Pavel A. Pevzner, *A new approach to evaluating statistical significance of spectral identifications*, Journal of Proteome Research, 2013, 12, 1560-1568.
- **Hosein Mohimani**, Wei-Ting Liu, Joshua S. Mylne, Aaron G. Poth, Michelle Colgrave, Michael Selsted, Pieter C. Dorrestein, and Pavel A. Pevzner,, *Cycloquest: Identification of cyclopeptides via database search of their mass spectra against genome databases*, Journal of Proteome Research, 2011, 10, 4505-4512.
- **Hosein Mohimani**, Yu-Liang Yang, Wei-Ting Liu, Pei-Wen Hsieh, Pieter C. Dorrestein, and Pavel Pevzner, *Sequencing Cyclic Peptides by Multistage Mass Spectrometry*, Journal of Proteomics, 2011, 11, 3642-50.
- **Hosein Mohimani**, Wei-Ting Liu, Yu-Liang Yang, Susana P. Gaudenico, William Fenical, Pieter C. Dorrestein, and Pavel Pevzner, *Multiplex De Novo Sequencing of Peptide Antibiotics*, Journal of Computational Biology, 2011, 18, 1371-1381.
- Emily Mevers,Wei-Ting Liu, Niclas Engene, **Hosein Mohimani**, Tara Byrum, Pavel A. Pevzner, Pieter C. Dorrestein, Carmenza Spadafora, and William H. Gerwick, *Cytotoxic veraguamides, alkynyl bromide-containing cyclic depsipeptides from the marine cyanobacterium cf. Oscillatoria margaritifera*, Journal of Natural Products, 2011, 74, 928-936.
- Massoud Babaie-Zadeh, Christian Jutten, **Hosein Mohimani**, *On the error of estimating the sparsest solution of underdetermined linear systems*, IEEE Trans. On Information Theory, 2011, 57, 7840-7855.
- **Hosein Mohimani**, Massoud Babaie-Zadeh and Christian Jutten, *A fast approach for overcomplete sparse decomposition based on smoothed L0 norm*, IEEE Trans. On Signal Processing, 2009, volume 57, 289-301.
- **Hosein Mohimani**, Farid Ashtiani, Adel Javanmard, Mazyiar Hamdi, *Mobility Modeling, Spatial Traffic Distribution, and Probability of Connectivity for Sparse and Dense Vehicular Ad-Hoc Networks*, IEEE Trans. On Vehicular Technology, 2009, 58, 1998-2007.
- **Hosein Mohimani**, Massoud Babaie-Zadeh, Irina Gorodnitsky, Christian Jutten, *SL0 : A covenrgence analysis*, arXiv:1001.5073.
- Farid Movahedi Naini, **Hosein Mohimani**, Massoud Babaie-Zadeh and Christian Jutten, *Estimating the mixing matrix in Sparse Component Analysis (SCA) based on partial k-dimensional subspace clustering*, Neurocomputing, 2008, vol. 71, 10-12, 2330-2343.

Journal Papers in preparation

- Neha Garg, Yi Zeng, Anna Edlund, Alexey Melnik, Laura Sanchez, **Hosein Mohimani**, Alexey Gurevich, Vivian Miao, Stefan Schiffler, Yan Wei Lim, Tal Luzzatto-Knaan, Shengxin Kai, Forest Rohwer, Pavel Pevzner, Rober Cichewicz, Theodore Alexandrov, Pieter Dorrestein, *The spatial molecular structure of the microbial community of peltigera lichen*, under review at mSystems.
- **Hosein Mohimani**, Alexey Gurevich, Pieter Dorrestein, Pavel Pevzner, *MetaRiPPquest: A Peptidogenomics Approach to Discovery of Novel Ribosomally Synthesized and Posttranslationally Modified Peptides*, in preparation.
- **Hosein Mohimani**, Alexey Gurevich, Pieter Dorrestein, Pavel Pevzner, *In silico Identification of Natural Products Through Database Search of Mass Spectra*, in preparation.
- Dima Meleshko, **Hosein Mohimani**, Marnix Medema, Pavel Pevzner, *AntiSPAdes : gene prediction in genomic and metagenomic graphs*, in preparation.

- Bahar Behsaz, **Hosein Mohimani**, Pieter Dorrestein, Pavel Pevzner, *Automated cyclic non-ribosomal peptide sequencing using mass spectrometry and Marfey analysis*, in preparation.
- Alexey Gurevich, **Hosein Mohimani**, Pieter Dorrestein, Pavel Pevzner, *Discovering novel variants of known natural products by search of their mass spectra*, in preparation.
- Sergey Chernov, Alexey Gurevich, **Hosein Mohimani**, Pieter Dorrestein, Pavel Pevzner, *SILAC-based natural product discovery*, in preparation.

Conference Papers

- **Hosein Mohimani**, Pavel Pevzner, *Dereplication, Sequencing and Identification of Peptidic Natural Products: from Genome Mining to Peptidogenomics to Spectal Networks*, 3rd International Conference on Circular Proteins (ICCP2015), Moreton Island, Australia, November 1-4 (Invited talk).
- **Hosein Mohimani**, Sangtae Kim, Pavel Pevzner, *MS-DPR: An algorithm for computing statistical significance of spectral identifications of non-linear peptides*, Workshop on Algorithms in Bioinformatics (WABI2012), Ljubljana, Slovenia, Lecture Notes in Computer Science, Volume 7534, 2012, pp 301-313.
- **Hosein Mohimani**, Wei-Ting Liu, Yu-Liang Yang, Susana P. Gaudenico, William Fenical, Pieter C. Dorrestein, and Pavel Pevzner, *Multiplex De Novo Sequencing of Peptide Antibiotics*, Vancouver, Research in Computational Molecular Biology (RECOMB2011), Lecture Notes in Computer Science, 2011, Volume 6577, 267-281.
- **Hosein Mohimani**, Wei-Ting Liu, Joshua S. Mylne, Aaron G. Poth, Michelle Colgrave, Michael Selsted, Pieter C. Dorrestein, and Pavel A. Pevzner, *Cycloquest: Identification of cyclopeptides via database search of their mass spectra against genome databases*, American Society of Pharmacognosy 2011 (ASP2011), San Diego (invited talk).
- Jayadev Acharya, Hirakendu Das, **Hosein Mohimani**, Alon Orlitsky, Shengjun Pan, *Exact calculation of pattern probabilities,*, IEEE International Symposium on Information Theory (ISIT2010), Austin, Texas, June 13 – 18, page 1498-1502.
- Massoud Babaie-Zadeh, **Hosein Mohimani**, Christian Jutten, *An upper bound on the estimation error of the sparsest solution of underdetermined linear systems*, in Proceedings of SPARS2009, Saint-Malo, France, 2009.
- **Hosein Mohimani**, Massoud Babaie-Zadeh and Christian Jutten, *Complex-valued Sparse Representation based on Smoothed L0 Norm*, 33rd IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2008), March 30 - April 4, Las Vegas.
- **Hosein Mohimani**, Massoud Babaie-Zadeh and Christian Jutten, *Fast Sparse Representation based on Smoothed L0 norm*, 7th International Conference on Independent Component Analysis and Signal Separation (ICA 2007), 9th - 12th September, London, UK, LNCS 4666, pp. 438-445.
- Hadi Zayyani, Massoud Babaie-Zadeh, **Hosein Mohimani**, Christian Jutten, *Sparse Component Analysis in Presence of Noise Using an Iterative EM-MAP Algorithm* , 7th International Conference on Independent Component Analysis and Signal Separation (ICA 2007), 9th - 12th September, London, UK, LNCS 4666, pp. 438-445.
- Elham Azizi, **Hosein Mohimani**, Massoud Babaie-Zadeh, *Adaptive Sparse Source Separation With Application To Speech Signals*, 2007 IEEE International Conference on Signal Processing and Communications (ICSPC 2007), 24th - 27th November, Dubai, UAE.
- Farid Movahedi Naini, **Hosein Mohimani**, Massoud Babaie-Zadeh, Christian Jutten, *Estimating the mixing matrix in Sparse Component Analysis (SCA) based on multidimensional subspace clustering*, 14th IEEE International Conference On Telecommunications and 8th IEEE Malaysia International Conference on Communications (ICT-MICC 2007), 14th - 17th May, Penang, Malaysia.

Patents

- Eric Stava, Jens Gundlach, Jeffrey Mandell, Kevin Gunderson, Ian Derrington, **Hosein Mohimani**, *Compositions and methods for polynucleotide sequencing,*, Issued by Illumina Inc, June 4th, 2015.

Honors and Awards

2010 **Rita L. Atkinson Graduate Fellowship** , *UC San Diego.*

2008 **Departmental fellowship from Electrical and Computer Engineering Department**, *UC San Diego.*

2003 **Bronze medal of 44th International Mathematics Olympiad**, *Tokyo, Japan.*

2002 **Gold medal of Iranian National Mathematics Olympiad**, *Tehran, Iran.*

Activities

January 2016 **COMNAP2016**, *Organizing 2016 Workshop on computational methods in natural product discovery, UC San Diego.*

March 2017 **RECOMB2017**, *Organizing 2017 RECOMB Conference on natural products and proteogenomics, UC San Diego.*