JOEL A. TROPP

talks & presentations

PLENARY ADDRESSES

1. "Randomly pivoted Cholesky." Plenary address. SIAM Applied Linear Algebra Conference, Paris, May 2024.

2. "Scalable semidefinite programming." Plenary address, TILOS Retreat (The Institute for Learning-Enabled Optimization at Scale), UC-San Diego, July 2022.

3. "Scalable semidefinite programming." Plenary address, Eighth International Conference on Computational Harmonic Analysis (ICCHA), Munich, Sep. 2022.

4. "Scalable semidefinite programming." Plenary address, International Conference on "Mathematics for Complex Data," Brummer & Partners MathDataLab, KTH Royal Institute of Technology, Stockholm, June 2022.

5. "Sketchy decisions: Convex low-rank matrix optimization with optimal storage." Plenary address, Simons Collaboration in Algorithms and Geometry, Sixth Annual Conference, New York, May 2020. Rescheduled online, Jan. 2021.

6. Keynote address, Conference on "Advances in Data Science: Theory, Methods, and Computation," Texas A&M University, College Station, September 2020. Canceled due to COVID-19.

7. "Sketchy SVD." Plenary address, Canadian Applied and Industrial Mathematics Society (CAIMS) Annual Meeting, July 2019.

8. "Sketchy decisions: Convex optimization with optimal storage." Plenary address, Third International Matheon-Conference on Compressed Sensing and its Applications, TU-Berlin, Dec. 2017.

9. "Applied random matrix theory." Plenary address, MINDS Symposium, Johns Hopkins University, Baltimore, Nov. 2017.

10. "Sketchy decisions: Convex optimization with optimal storage." Plenary address, Wavelets and Sparsity XVII, SPIE Optics & Photonics, San Diego, Aug. 2017.

11. "Applied random matrix theory." Plenary address, Foundations of Computational Mathematics (FoCM 2017), Barcelona, July 2017.

12. "Sketchy decisions: Convex low-rank matrix optimization with optimal storage." Plenary address, IMS Program on Data Sciences: Bridging Mathematics, Physics and Biology, National Univ. Singapore, May 2017.

13. "Finding structure with randomness: Modern algorithms for low-rank matrix approximation." Keynote address, Amazon Research Scientist Summit, Cle Elum, Sep. 2016.

14. "Concentration inequalities for random matrices." SIAM Invited Address, Joint Mathematical Meetings (JMM), San Antonio, Jan. 2015.

15. "Living on the edge: Phase transitions in random convex optimization problems." Plenary address, Modern Time–Frequency Methods, Strobl, June 2014.

16. "Living on the edge: Phase transitions in random convex optimization problems." Plenary address, Matheon-Workshop, Matrix Computations for Sparse Recovery, TU Berlin, Apr. 2014.

17. "Living on the edge: A geometric theory of phase transitions in convex optimization." Plenary address, International Workshop on Advances in Regularization, Optimization, Kernel Methods, and Support Vector Machines: Theory and Applications (ROKS 2013), Leuven, July 2013.

18. "Sharp recovery bounds for convex deconvolution, with applications." Plenary address, First International Traveling Workshop for Interacting Sparse Models and Technology (iTwist), Marseille, May 2012.

19. "Finding structure with randomness: Probabilistic algorithms for constructing approximate matrix decompositions." Plenary address, Signal Processing with Adaptive Sparse Structured Representations (SPARS) Workshop, Edinburgh, June 2011.

20. "User-friendly tail bounds for sums of random matrices." Principal lecture, Summer Informal Regional Functional Analysis Seminar (SUMIRFAS), Texas A&M Univ., College Station, July 2010.

21. "User-friendly tail bounds for sums of random matrices." Plenary address, Sparsity and Computation Workshop, Hausdorff Center for Mathematics, Univ. Bonn, June 2010.

22. "Sparse representations." Vasil A. Popov Prize Lecture, Approximation Theory 13 Conference, San Antonio, Feb. 2010.

23. "Column subset selection, matrix factorization, and eigenvalue optimization." Plenary address, Householder Symposium XVII, Zeuthen, June 2008.

24. "On the linear independence of spikes and sines." Semiplenary address, 2007 AMS von Neumann Symposium on "High-dimensional geometry and sparse representations," Snowbird, June 2007.

25. "Beyond Nyquist: Efficient sampling of sparse, bandlimited signals." Plenary address, Sampling Theory and Applications (SampTA), Thessaloniki, June 2007.

26. "Sublinear algorithms for Compressed Sensing." Plenary address, Signal Processing with Adaptive Sparse Structured Representations (SPARS) Workshop, Rennes, Nov. 2005.

TUTORIALS AND SHORT COURSES

27. "Randomized numerical linear algebra." Short course, winter school "Advanced numerical method for machine and deep learning", Univ. Ferrara, Jan. 2025.

28. "Random matrix theory." Short course, Peking University, Beijing, July 2024.

29. "Randomized numerical linear algebra." Short course, AI4OPT Institute, Georgia Tech, Atlanta, March 2024.

30. "Randomized numerical linear algebra." Short course, CIME summer school "Machine learning: from data to mathematical understanding," Cetraro, July 2023.

31. "Randomization in Numerical Linear Algebra." Tutorial, "Perspectives on Matrix Computations" Workshop, Banff International Research Station (BIRS), Banff, Mar. 2023.

32. "Matrix concentration." Short course, Research Training Group, Mathematics Dept., TU-Munich, May 2021. Online.

33. "Matrix concentration & computational linear algebra." Short course, summer school "High-dimensional probability and algorithms," École Normale Supérieure, Paris, July 2019.

34. "Structured signal processing via convex programming." Short course, spring school "Structural inference in statistics," Malente, Mar. 2017.

35. "Finding structure with randomness: Probabilistic algorithms for linear algebra." Tutorial, International Conference on Machine Learning (ICML), Beijing, June 2014.

36. "User-friendly tools for studying random matrices." Tutorial, Simons Institute for the Theory of Computing, Big Data Boot Camp, Berkeley, Sep. 2013.

37. "User-friendly tools for studying random matrices." Tutorial, Neural Information Processing Systems (NIPS), Stateline, Dec. 2012.

38. "Compressive Sampling." Tutorial, Compressed Sensing Workshop, California Inst. Tech., May 2012.

39. "User-friendly tail bounds for sums of random matrices." Tutorial, workshop on High-Dimensional Phenomena, Institute for Mathematics and its Applications (IMA), Univ. Minnesota at Twin Cities, Sep. 2011.

40. "Sparsity and Regularization." Tutorial, workshop on Instantaneous Frequencies and Trends for Nonstationary Nonlinear Data, Institute for Mathematics and its Applications (IMA), Univ. Minnesota at Twin Cities, Sep. 2011.

41. "User-friendly tail bounds for sums of random matrices." Summer Research Institute, École Polytechnique Fédérale de Lausanne (EPFL), June 2011.

42. "CoSaMP: Iterative signal recovery from incomplete and inaccurate samples." Invited lecturer for course "Méthodes variationelles et parcimonieuses en traitement de signaux et des images" (Variational and sparse methods in signal and image processing), Institut Henri Poincaré, Paris, Mar. 2008.

43. "Compressive Sampling." Shanks Workshop, Vanderbilt Univ., Nashville, Oct. 2007.

44. "An introduction to matching pursuits." AMS von Neumann Symposium on "High-dimensional geometry and sparse representations," Inst. Pure and Applied Mathematics (IPAM), Univ. California at Los Angeles, May 2007.

COLLOQUIA

45. "Randomly pivoted Cholesky." ORFE Colloquium, Princeton Univ., Sep. 2024.

46. "Randomly pivoted Cholesky." Boeing Applied Mathematics Colloquium, Univ. Washington at Seattle, April 2024.

47. "Randomly pivoted Cholesky." UCLA Applied Mathematics Colloquium, Univ. California at Los Angeles, Mar. 2023.

48. "Randomly pivoted Cholesky." LAA Schneider Colloquium, Univ. Wisconsin at Madison, Nov. 2022.

49. "Universality laws for randomized dimension reduction." Distinguished colloquium, Turkish Mathematical Society, Feb. 2022. Online.

50. "The randomized SVD." Courant Colloquium, New York Univ., Jan 2022. Online.

51. "The randomized SVD." ECE 297 Seminar Series, Univ. California at Los Angeles, Nov. 2021. Online.

52. "The randomized SVD." Computer Science Colloquium, ETH Zürich, May 2021. Online.

53. Max Planck Colloquium, Max Planck Institute for Mathematics in the Sciences, Leipzig, Sep. 2020. Online.

54. "Applied random matrix theory." Mathematics Colloquium, Univ. Warwick, May 2019.

55. "Applied random matrix theory." Mathematics Colloquium, Univ. California at San Diego, Feb. 2019.

56. "Applied random matrix theory." Mathematics Colloquium, Univ. California at Irvine, Jan. 2019.

57. "Applied random matrix theory." Computational Applied Mathematics Colloquium. Cornell Univ., Oct. 2018.

58. "Applied random matrix theory." MADDD Seminar Opening Event, Univ. California at Davis, Oct. 2018.

59. "Phase transitions and conic geometry." Ordway Distinguished Lecture. Mathematics Colloquium, Univ. Minnesota, Minneapolis, April 2018.

60. "Applied random matrix theory." Ordway Distinguished Lecture. Applied Mathematics Colloquium, Univ. Minnesota, Minneapolis, April 2018.

61. "Applied random matrix theory." Mathematics Colloquium, Vanderbilt Univ., Nashville, Sep. 2017.

62. "Sketchy decisions: Convex low-rank matrix optimization with optimal storage." Statistics Colloquium, Univ. Michigan, Ann Arbor, Apr. 2017.

63. "Sketchy decisions: Convex low-rank matrix optimization with optimal storage." Applied Mathematics Colloquium, Massachusetts Inst. Tech., Cambridge, Apr. 2017.

64. "Universality laws for randomized dimension reduction." Statistics Colloquium, Harvard Univ., Cambridge, Apr. 2017.

65. "Universality laws for randomized dimension reduction." Mathematics Colloquium, Case Western Reserve, Oct. 2016.

66. "Universality laws for randomized dimension reduction." Statistics Colloquium, Univ. Chicago, Apr. 2016.

67. "Applied random matrix theory." ML/Google Distinguished Lecture, Carnegie Mellon Univ., Apr. 2016.

68. "Finding structure with randomness: Probabilistic algorithms for randomized matrix approximation." Computer Science Colloquium, Princeton Univ., Mar. 2016.

69. "Applied random matrix theory." CORE Seminar, Univ. Washington, Seattle, Apr. 2015.

70. "Living on the edge: A geometric theory of phase transitions in convex optimization." ISL Colloquium, Stanford Univ., Nov. 2013.

71. "Living on the edge: A geometric theory of phase transitions in convex optimization." PACM Colloquium, Princeton Univ., Sep. 2013.

72. "Living on the edge: A geometric theory of phase transitions in convex optimization." ICES Colloquium, Univ. Texas at Austin, May 2013.

73. "Sharp recovery bounds for convex demixing, with applications." Applied Mathematics Colloquium, Univ. California at Los Angeles, Nov. 2012.

74. "User-friendly tail bounds for sums of random matrices." Claremont Colleges Mathematics Colloquium, Claremont, Oct. 2012.

75. "How to find a needle in a haystack." Distinguished Applied Mathematics Colloquium, US Naval Acad., Annapolis, Mar. 2012.

76. "Finding structure with randomness: Probabilistic algorithms for constructing approximate matrix decompositions." Applied & Computational Mathematics Colloquium, California Inst. Tech, Jan. 2012.

77. "Finding structure with randomness: Probabilistic algorithms for constructing approximate matrix decompositions." Distinguished Colloquium, Institute of Applied Mathematics, Univ. British Columbia, Oct. 2011.

78. "Finding structure with randomness: Probabilistic algorithms for constructing approximate matrix decompositions." Wharton Statistics Colloquium, Univ. Pennsylvania, Sep. 2010.

79. "Beyond Nyquist: Efficient sampling of sparse, bandlimited signals." Colloquium, Applied Mathematics Dept., Univ. Colorado at Boulder, Sep. 2008.

80. "Beyond Nyquist: Efficient sampling of sparse, bandlimited signals." Colloquium, Electrical and Computer Engineering Dept., Rice Univ., Houston, Mar. 2007.

81. "Sublinear algorithms for Compressed Sensing." Colloquium, Electrical and Computer Engineering Dept., Rice Univ., Houston, Jan. 2006.

82. "Signal recovery from random measurements." Colloquium, Electrical and Computer Engineering Dept., Rice Univ., Houston, May 2005.

83. "Recent theoretical advances in sparse approximation." Colloquium, Electrical and Computer Engineering Dept., Rice Univ., Houston, Nov. 2003.

INVITED SEMINARS

84. "Randomly pivoted Cholesky." Math and Data Seminar, New York Univ., Sep. 2024.

85. "Positive random walks and random psd matrices." IDeAS Seminar, Princeton Univ., Sept. 2024.

86. "Randomly pivoted Cholesky." Machine Learning and Data Science Seminar, Oxford Univ., June 2024.

87. "Randomly pivoted Cholesky." One World MINDS Seminar, Michigan State, Lansing, May 2023.

88. "Scalable semidefinite programming." One World MINDS Seminar, Sep. 2021. Online.

89. "SketchySVD." Probability for Machine Learning Seminar, Oxford Univ., June 2021. Online.

90. "Sketchy decisions: Convex low-rank matrix optimization with optimal storage." Fast Fourier Talks, Mathematics Dept., Univ. Maryland at College Park, Apr. 2021. Online.

91. "The randomized SVD." Babuška Forum, Oden Institute, Univ. Texas at Austin, Apr. 2021. Online.

92. "Sketchy decisions: Convex low-rank matrix optimization with optimal storage." Stanford ISL Colloquium, Apr. 2021. Online.

93. "SketchySVD." ICES Seminar, Univ. Texas at Austin, Apr. 2019.

94. "Phase transitions and conic geometry." Probability Seminar, Univ. California at Irvine, Jan. 2019.

95. "Sketchy decisions: Convex low-rank matrix optimization with optimal storage." Statistics Seminar, Cambridge Univ., June 2018.

96. "Applied random matrix theory." Computational and Applied Mathematics Seminar, Oxford Univ., June 2018.

97. "Sketchy decisions: Convex low-rank matrix optimization with optimal storage." Ordway Distinguished Lecture. Data Science Seminar, Univ. Minnesota, Minneapolis, April 2018.

98. "Universality in geometric random matrix theory." Random Matrix Theory seminar, program on Quantitative Linear Algebra, Institute for Pure and Applied Mathematics (IPAM), April 2018.

99. "Sketchy decisions: Convex low-rank matrix optimization with optimal storage." Statistics Seminar, ISyE, Georgia Tech, Atlanta, Mar. 2018.

100. "Applied random matrix theory." CMX Seminar, Caltech, Pasadena, Feb. 2018.

101. "Sketchy decisions: Convex low-rank matrix optimization with optimal storage." Math and Data Seminar, New York Univ., New York, Apr. 2017.

102. "Sketchy decisions: Convex low-rank matrix optimization with optimal storage." IDeAS Seminar, Princeton Univ., Princeton, Apr. 2017.

103. "Sketchy decisions: Convex low-rank matrix optimization with optimal storage." Statistics Seminar, Yale Univ., New Haven, Apr. 2017.

104. "Sketchy decisions: Convex low-rank matrix optimization with optimal storage." CMI Faculty Seminar, Caltech, Pasadena, Feb. 2017.

105. "Universality in geometric random matrix theory." Caltech–UCLA Analysis Seminar, Univ. California at Los Angeles, May 2016.

106. "Universality laws for randomized dimension reduction, with applications." Applied Mathematics Seminar, Stanford Univ., Palo Alto, May 2016.

107. "Universality laws for randomized dimension reduction, with applications." Applied Mathematics Seminar, Univ. Michigan at Ann Arbor, Apr. 2016.

108. "Universality laws for randomized dimension reduction, with applications." SILO Seminar, Univ. Wisconsin at Madison, Apr. 2016.

109. "The expected norm of a sum of independent random matrices." IDeAS Seminar, Princeton Univ., Mar. 2016.

110. "Universality laws for randomized dimension reduction, with applications." ML/Algorithms Seminar, Princeton Univ., Mar. 2016.

111. "Universality laws for randomized dimension reduction, with applications." Center for Imaging Sciences Seminar, Johns Hopkins Univ., Baltimore, Feb. 2016.

112. "Universality laws for randomized dimension reduction, with applications." Center for Mathematics of Information (CMI) Faculty Meeting, Caltech, Pasadena, Nov. 2015.

113. "Applied random matrix theory." Statistics Seminar, Univ. California at Los Angeles, Oct. 2015.

114. "Matrix concentration inequalities via the method of exchangeable pairs." Probability Seminar, Univ. Luxembourg, Apr. 2015.

115. "An introduction to matrix concentration inequalities." Applied Mathematics Seminar, US Naval Acad., Annapolis, Mar. 2015.

116. "Finding structure with randomness and living on the edge." Seminar, Office of Naval Research, Arlington, Mar. 2015.

117. "Finding structure with randomness: Randomized approximation of matrices." AI Seminar, Information Sciences Institute (ISI), Univ. Southern California, Marina del Rey, Aug. 2014.

118. "User-friendly tail bounds for sums of random matrices." Joint Caltech–UCLA Analysis Seminar, Univ. California at Los Angeles, Jan. 2014.

119. "User-friendly tail bounds for sums of random matrices." Probability and Statistics Seminar, Univ. Southern California, Los Angeles, Nov. 2013.

120. "Sharp recovery bounds for convex deconvolution, with applications." Special Lecture, Computer Science Dept., Univ. Wisconsin at Madison, July 2012.

121. "Sharp recovery bounds for convex deconvolution, with applications." Machine Learning Seminar, Electrical Engineering Dept., California Inst. Tech., May 2012.

122. "Finding structure with randomness: Probabilistic algorithms for constructing approximate matrix decompositions." Applied Mathematics Seminar, Claremont McKenna College, Claremont, Oct. 2011.

123. "Finding structure with randomness: Probabilistic algorithms for constructing approximate matrix decompositions." Seminar, Los Alamos National Laboratory (LANL), Los Alamos, Aug. 2011.

124. "Finding structure with randomness: Probabilistic algorithms for constructing approximate matrix decompositions." Seminar, United Technologies Research Corporation (UTRC), East Hanover, Apr. 2011.

125. "Finding structure with randomness: Probabilistic algorithms for constructing approximate matrix decompositions." Laboratory for Information and Decision Systems (LIDS) Seminar, Massachusetts Inst. Tech., Cambridge, Apr. 2011.

126. "Two proposals for robust PCA via semidefinite programming." Social and Information Sciences Laboratory (SISL) Seminar, California Inst. Tech., Pasadena, Apr. 2011.

127. "User-friendly tail bounds for sums of random matrices." Center for Mathematics of Information (CMI) faculty meeting, California Inst. Tech., Pasadena, Jan. 2011.

128. "Finding structure with randomness: Stochastic algorithms for constructing approximate matrix decompositions." Optimization Seminar, Univ. Wisconsin at Madison, May 2010.

129. "User-friendly tail bounds for sums of random matrices." Wainwright reading group, Statistics Dept., Univ. California at Berkeley, Apr. 2010.

130. "Finding structure with randomness: Stochastic algorithms for constructing approximate matrix decompositions." Matrix Computations Seminar, Computer Science Dept., Univ. California at Berkeley, Apr. 2010.

131. "Finding structure with randomness: Stochastic algorithms for constructing approximate matrix decompositions." Computational Harmonic Analysis Seminar, Courant Inst., New York Univ., Mar. 2010.

132. "Exploiting randomness for numerical algorithms." Center for Mathematics of Information (CMI) faculty meeting, California Inst. Tech., Apr. 2009.

133. "Beyond Nyquist: Efficient sampling of sparse, bandlimited signals." Applied Mathematics Seminar, Mathematics Dept., Stanford Univ., Palo Alto, Apr. 2009.

134. "CoSaMP: Iterative signal recovery from incomplete and inaccurate samples." Signal Processing Seminar, Electrical Engineering Dept., Technion, Haifa, May 2008.

135. "CoSaMP: Iterative signal recovery from incomplete and inaccurate samples." Google Research, New York, May 2008.

136. "CoSaMP: Iterative signal recovery from incomplete and inaccurate samples." Center for Mathematics of Information (CMI) seminar, California Inst. Tech., Jan. 2008.

137. "On the linear independence of spikes and sines." Applied Mathematics Seminar, Mathematics Dept., Univ. California at Davis, Nov. 2007.

138. "On the linear independence of spikes and sines." Seminar, Program in Applied and Computational Math., Princeton Univ., Princeton, Sep. 2007.

139. "Sparse solutions to underdetermined linear systems." Numerical Analysis Seminar, Mathematics Dept., Courant Inst., New York Univ., New York, Apr. 2007.

140. "Sparse solutions to underdetermined linear systems." Applied Mathematics Seminar, Mathematics Dept., Duke Univ., Durham, Mar. 2007.

141. "Sparse solutions to underdetermined linear systems." Wireless Networking and Communications Group Seminar, Electrical Engineering Dept., Univ. Texas at Austin, Mar. 2007.

142. "Beyond Nyquist: Efficient sampling of sparse, bandlimited signals." Seminar, Electrical Engineering Dept., Harvard Univ., Cambridge, Mar. 2007.

143. "Sparse solutions to underdetermined linear systems." Seminar, Toyota Tech. Inst., Chicago, Feb. 2007.

144. "Sparse solutions to underdetermined linear systems." Seminar, Applied and Computational Mathematics, California Inst. Tech., Pasadena, Feb. 2007.

145. "Sparse solutions to underdetermined linear systems." Joint Machine Learning and Statistics Seminar, Computer Science Dept., Carnegie Mellon Univ., Pittsburgh, Feb. 2007.

146. "Sparse solutions to underdetermined linear systems." Statistics Seminar, College of Industrial and Systems Engineering (ISyE), Georgia Inst. Tech., Atlanta, Jan. 2007.

147. "Sparse solutions to underdetermined linear systems." Applied Mathematics Seminar, Mathematics Dept., Univ. Minnesota at Twin Cities, Dec. 2006.

148. "Sparse solutions to underdetermined linear systems." Applied Mathematics and Approximation Theory Seminars, Mathematics Dept., Univ. Utah at Salt Lake City, Sept. 2006.

149. "Signal recovery from random measurements." Control, Communications, and Signal Processing Seminar, Electrical Engineering Dept., Univ. Wisconsin at Madison, Aug. 2006.

150. "Sublinear algorithms for Compressed Sensing." Communications, Networking, and Signal and Image Processing Seminar, Electrical and Computer Engineering Dept., Purdue Univ., West Lafayette, Apr. 2006.

151. "Sublinear algorithms for Compressed Sensing." Theoretical Computer Science Seminar, Univ. Michigan at Ann Arbor, Nov. 2005.

152. "Signal recovery from partial information." Applied Mathematics Seminar, Univ. Minnesota at Twin Cities, Apr. 2005.

153. "Greed is good: Algorithmic results for sparse approximation." Time–Frequency Brown Bag (TFBB) Seminar, Program in Applied and Computational Mathematics, Princeton Univ., Princeton, Mar. 2003.

CONFERENCE AND WORKSHOP PRESENTATIONS

154. "XTrace: Making the most of every sample in stochastic trace estimation." Invited talk, "Numerical Linear Algebra" Workshop, Foundations of Computational Mathematics, Paris, June 2023.

155. "Randomly pivoted Cholesky." Semi-plenary talk, "Computational Harmonic Analysis and Data Science" Workshop, Foundations of Computational Mathematics, Paris, June 2023.

156. "Random sparse Hamiltonians and quantum advantage." Invited talk, "Random Matrices" Workshop, Foundations of Computational Mathematics, Paris, June 2023.

157. "Random products and quantum simulation," ICTS Program on Advances in Applied Probability, January 2021. Online.

158. "SketchySVD." Invited talk, workshop on "Mathematics of Data: Structured Representations for Sensing, Approximation, and Learning," Alan Turing Institute, London, May 2019.

159. "SketchySVD." Invited talk, workshop on "Geometry of big data," Institute for Pure and Applied Mathematics, Univ. California at Los Angeles, May 2019.

160. "SketchySVD." Invited talk, workshop on "Optimization and Statistical Learning," Les Houches, Mar. 2019.

161. "Universality laws in geometric random matrix theory." Invited talk, AMS Special Session on "Random matrix theory beyond Wigner and Wishart," Fall AMS Central Sectional Meeting, Ann Arbor, Oct. 2018.

162. "Sketchy decisions: Convex low-rank matrix optimization with optimal storage." Invited talk, workshop on Nonconvex Formulations and Algorithms in Data Sciences, Madison, July 2018.

163. "Sketchy decisions: Convex low-rank matrix optimization with optimal storage." Invited talk, minisymposium on "Randomized numerical algorithms: Foundations and practice," SIAM Annual Meeting, Portland, July 2018.

164. "Concentration of conic intrinsic volumes." Invited talk, workshop on Concentration of Measure and its Applications, Institute d'Études Scientifiques de Cargèse (IESC), Cargèse, May 2018.

165. "Sketchy decisions: Convex optimization with optimal storage." Invited talk, workshop on "Beyond Convexity," Casa Matemática Oaxaca, Oct. 2017.

166. "Universality laws for randomized dimension reduction." Invited talk at the Borchard Colloquium, A French/American Collaborative Colloquium on Concentration Inequalities, High-Dimensional Statistics, and Stein's Method, Missillac, July 2017.

167. "Universality laws for randomized dimension reduction, with applications." Invited talk, workshop on "Applied Harmonic Analysis, Massive Data Sets, Machine Learning, and Signal Proessing," Casa Matemática Oaxaca, Oct. 2016.

168. "Approximate integral geometry." Invited talk, Perspectives on Integral Geometry, Athens, GA, May 2016.

169. "Universality laws for randomized dimension reduction, with applications." Invited talk, workshop on "Harmonic Analysis, Graphs, and Learning," Hausdorff Institute for Mathematics, Bonn, Mar. 2016.

170. "Universality laws for randomized dimension reduction, with applications." Invited talk, February Fourier Talks, Norbert Wiener Center, Univ. Maryland, College Park, Feb. 2016.

171. "Finding structure with randomness." Invited talk, Development of Modern Methods for Linear Algebra (DMML), Univ. California at Berkeley, Oct. 2015.

172. "Applied random matrix theory." Invited talk, Conference on Big Data, Center for Mathematical Sciences and Applications (CSMA), Harvard Univ., Cambridge, Aug. 2015.

173. "Applied random matrix theory." Invited talk, workshop on Sensing and Analysis of High-Dimensional Data (SAHD), Duke Univ., Durham, July 2015.

174. "Sampling theorems for structured signals." Invited talk, special session on "Compressed sensing," 38th Conference on Stochastic Processes and their Applications (SPA), Oxford, July 2015.

175. "Applied random matrix theory." Invited talk, workshop on New Directions in Stein's Method, Institute for Mathematical Sciences (IMS), National Univ. Singapore (NUS), Singapore, May 2015.

176. "Sampling theorems for structured signals." Compressive Sampling Pioneer Award talk, SPIE.DSS, Baltimore, Apr. 2015.

177. "Phase transitions in convex optimization problems with random data." Invited talk, 10th Encuentro Regional de Probabilidad e Estadística Matemática (ERPEM 2014), Instituto Nacional de Matemática Pura e Aplicada (IMPA), Rio de Janeiro, Nov. 2014.

178. "Finding structure with randomness." Invited talk, QUALCOMM Advanced Modem Technologies Forum, La Jolla, Oct. 2014.

179. "User-friendly tail bounds for sums of random matrices," Invited talk, High-Dimensional Probability VII, Cargèse, May 2014.

180. "Living on the edge: Phase transitions in random convex optimization problems." Invited talk, UCL-Duke Workshop on Sensing and Analysis of High-Dimensional Data (SAHD), Univ. College London, Sep. 2014.

181. "Living on the edge: A geometric theory of phase transitions in convex optimization." Invited talk, Program on Low-Dimensional Structure in High-Dimensional Systems: Opening Workshop, SAMSI, Research Triangle Park, Sept. 2013.

182. "Living on the edge: A geometric theory of phase transitions in convex optimization." Invited talk, workshop on Sensing and Analysis of High-Dimensional Data (SAHD), Duke Univ., Durham, July 2013.

183. "Sharp recovery bounds for convex demixing with applications." Invited talk, QUALCOMM Advanced Modem Technologies Forum, La Jolla, May 2013.

184. "The future of numerical linear algebra?" Invited talk, DARPA Workshop on Big Data and Large-Scale Analytics, Arlington, Mar. 2013.

185. "User-friendly tools for studying random matrices." Invited talk, 31st Annual Western States Mathematical Physics Meeting, Caltech, Pasadena, Feb. 2013.

186. "Sharp recovery bounds for convex demixing, with applications." Invited talk, Information Theory and Applications (ITA) workshop, Univ. California at San Diego, La Jolla, Feb. 2013.

187. "Sharp recovery bounds for convex demixing, with applications." Invited talk, IPAM workshop on Structure and Randomness in System Identification and Learning, Univ. California at Los Angeles, Jan. 2011.

188. "Sharp recovery bounds for convex demixing, with applications." AFOSR Complex Networks Program Review, Princeton Univ., Princeton, Oct. 2011.

189. "Sharp recovery bounds for convex deconvolution, with applications." Invited talk, minisymposium on Conic and Convex Programming in Statistics and Signal Processing, International Symposium on Mathematical Programming (ISMP), Berlin, Aug. 2012.

190. "Sharp recovery bounds for convex deconvolution, with applications." Invited talk, workshop on Applied Harmonic Analysis and Sparse Approximation, Mathematisches Forschungsinstitut Oberwolfach (MFO), Oberwolfach, June 2012.

191. "How to find a needle in a haystack." Invited talk, QUALCOMM Advanced Modem Technologies Forum, La Jolla, Apr. 2012.

192. "How to find a needle in a haystack." Invited talk, workshop on Probabilistic Techniques and Algorithms, Austin, Apr. 2012.

193. "How to find a needle in a haystack." Invited talk, Information Theory and Applications (ITA) workshop, Univ. California at San Diego, La Jolla, Feb. 2012.

194. "User-friendly tail bounds for sums of random matrices." Invited talk, workshop on High-Dimensional Problems in Statistics, Zürich, Sep. 2011.

195. "Finding structure with randomness: Stochastic algorithms for constructing approximate matrix decompositions." Invited talk, workshop on Sensing and Analysis of High-Dimensional Data (SAHD), Duke Univ., Durham, July 2011.

196. "Finding structure with randomness: Stochastic algorithms for constructing approximate matrix decompositions." Invited talk, workshop on Learning Theory, Foundations of Computational Mathematics (FOCM) conference, Budapest, July 2011.

197. "User-friendly tail bounds for sums of random matrices." Invited talk, workshop on Random Matrix Theory, Computations, and Applications, Foundations of Computational Mathematics (FOCM) conference, Budapest, July 2011.

198. "Beyond Nyquist: Efficient sampling of sparse, bandlimited signals." Invited talk, QUALCOMM Advanced Modem Technologies Forum, La Jolla, May 2011.

199. "Two proposals for robust PCA via semidefinite programming." AFOSR Complex Networks Program Review, Univ. Wisconsin at Madison, Madison, May 2011.

200. "User-friendly tail bounds for sums of random matrices." Invited talk, workshop on Random Matrices, Geometric Functional Analysis, and Algorithms, Mathematisches Forschungsinstitut Oberwolfach (MFO), Oberwolfach, May 2011.

201. "User-friendly tail bounds for sums of random matrices." Invited talk, workshop on Random Matrices and High-Dimensional Statistics, Univ. Minnesota at Twin Cities, Minneapolis, May 2011.

202. "Two proposals for robust PCA via semidefinite programming." Invited talk, Information Theory and Applications (ITA) workshop, Univ. California at San Diego, La Jolla, Feb. 2011.

203. "User-friendly tail bounds for sums of random matrices." Invited talk, Sparse statistics, optimization, and machine learning, Banff International Research Station (BIRS), Banff, Jan. 2011.

204. "Two proposals for robust PCA via semidefinite programming." Invited talk, IPAM Optimization Program culminating workshop, Lake Arrowhead, Dec. 2010.

205. "Sparse approximation and channel coding." Invited talk, QUALCOMM Interference Cancellation Forum, La Jolla, Aug. 2010.

206. "Compressive Sampling [Aerial View]." Invited talk, DDR&E Complex Systems Study, Squam Lake, July 2010.

207. "The sparsity gap: Uncertainty principles proportional to dimension." Invited talk, From Banach Spaces to Frame Theory and Applications: In Honor of Professor Pete Casazza's 65th Birthday, Norbert Wiener Center, Univ. Maryland at College Park, May 2010.

208. "Finding structure with randomness: Stochastic algorithms for constructing approximate matrix decompositions." Invited talk, AFOSR Frames and Compressed Sensing Workshop, Arlington, May 2010.

209. "Finding structure with randomness: Stochastic algorithms for constructing approximate matrix decompositions." Invited talk, ONR Compressed Sensing Workshop, Georgia Inst. Tech., Atlanta, May 2010.

210. "Finding structure with randomness: Stochastic algorithms for constructing approximate matrix decompositions." Invited talk, minisymposium on "Randomness in sensing and computation," SIAM Imaging Sciences Conf., Chicago, Apr. 2010.

211. "Finding structure with randomness: Stochastic algorithms for constructing approximate matrix decompositions." Invited talk, focus session on "Mathematics of information," British Applied Mathematics Colloquium, Edinburgh, Apr. 2010.

212. "The sparsity gap: Uncertainty principles proportional to dimension." Invited talk, 44th Ann. IEEE Conf. Information Sciences and Systems, Princeton Univ., Princeton, Mar. 2010.

213. "Finding structure with randomness: Stochastic algorithms for constructing approximate matrix decompositions." Invited talk, Information Theory and Applications (ITA) workshop, Univ. California at San Diego, La Jolla, Feb. 2010.

214. "Finding structure with randomness: Stochastic algorithms for constructing approximate matrix decompositions." Invited talk, AFOSR Program Review "Complex Networks," Arlington, Jan. 2010.

215. "Finding structure with randomness: Stochastic algorithms for constructing approximate matrix decompositions." Invited talk, IITK Workshop on Algorithms for Processing Massive Data Sets, Computer Science and Engineering Dept., India Inst. Tech., Kanpur, Dec. 2009.

216. "Finding structure with randomness: Stochastic algorithms for constructing approximate matrix decompositions." Invited talk, Int. Conf. Sparse Representations of Multiscale Data and Images: Theory and Applications, Nanyang Tech. Univ., Singapore, Dec. 2009.

217. "Finding structure with randomness: Stochastic algorithms for constructing approximate matrix decompositions." Center for Mathematics of Information (CMI) workshop, California Inst. Tech., Pasadena, Nov. 2009.

218. "Finding structure with randomness: Stochastic algorithms for constructing approximate matrix decompositions." Invited talk, minisymposium on "Randomized algorithms in linear algebra," SIAM Applied Linear Algebra, Monterey, Oct. 2009.

219. "CoSaMP: Iterative signal recovery from incomplete and inaccurate samples." Working group on "Streaming, coding, and compressive sensing: Unifying theory and common applications to sparse signal/data analysis and processing," DIMACS, Rutger Univ., Piscataway, Mar. 2009.

220. "Column subset selection, matrix factorization, and eigenvalue optimization." Workshop on "Frames from First Principles: Error correction, symmetry goals, and numerical efficiency," Banff International Research Station, Banff, Mar. 2009.

221. "Beyond Nyquist: Efficient sampling of sparse, bandlimited signals." Compressive Sensing Workshop, Duke Univ., Durham, Feb. 2009.

222. "Beyond Nyquist: Efficient sampling of sparse, bandlimited signals." Information Theory and Applications (ITA) workshop, Univ. California at San Diego, Feb. 2009.

223. "Beyond Nyquist: Efficient sampling of sparse, bandlimited signals." ONR Workshop on Compressed Sensing, Annapolis, Feb. 2009.

224. "Column subset selection, matrix factorization, and eigenvalue optimization." 2009 ACM–SIAM Symp. Discrete Algorithms, New York, Jan. 2009.

225. "Column subset selection, matrix factorization, and eigenvalue optimization." Princeton Geometry Workshop, Princeton Univ., Princeton, Oct. 2008.

226. "A2I: Theory and Algorithms." Kickoff meeting for "DARPA analog-to-information receiver development program," Herndon, Sep. 2008.

227. "Beyond Nyquist: Efficient sampling of sparse, bandlimited signals." Invited talk, workshop on "Frames for the Discrete World," American Inst. Mathematics, Palo Alto, Aug. 2008.

228. "CoSaMP: Iterative signal recovery from incomplete and inaccurate samples." Invited talk, special session on "Algorithms for compressed sensing: Alternatives to l_1 minimization," SIAM Imaging Sciences Conf., San Diego, July 2008.

229. "Column subset selection, matrix factorization, and eigenvalue optimization." Invited talk, Workshop on Algorithms for Modern Massive Datasets, Palo Alto, June 2008.

230. "CoSaMP: Iterative signal recovery from incomplete and inaccurate samples." Invited talk, SIAM Optimization Conf., Boston, May 2008.

231. "Sparse approximation and channel coding." Invited talk, Workshop on Information Geometry, Massachusetts Inst. Tech., Cambridge, May 2008.

232. "CoSaMP: Iterative signal recovery from incomplete and inaccurate samples." Invited talk, Workshop on Sparsity in High-Dimensional Statistics and Learning Theory, Georgia Inst. Tech., Atlanta, Mar. 2008.

233. "CoSaMP: Iterative signal recovery from incomplete and inaccurate samples." Invited talk, special session on "Compressive Sensing," Information Theory and Applications (ITA) workshop, San Diego, Jan. 2008.

234. "Sparse solutions to underdetermined linear systems." Center for Mathematics of Information (CMI) Retreat, California Inst. Tech., La Cañada–Flintridge, Oct. 2007.

235. "Kernel learning with matrix Bregman divergences." Invited talk, minisymposium on "Novel matrix methods for internet data mining," 6th Int. Conf. Industrial and Applied Mathematics (ICIAM), Zürich, July 2007.

236. "Beyond Nyquist: Efficient sampling of sparse bandlimited signals." Invited talk, minisymposium on "Compressive Sampling," 6th Int. Conf. Industrial and Applied Mathematics (ICIAM), Zürich, July 2007.

237. "Challenges in Compressive Sampling." Invited talk, ONR Workshop "PIs Brainstorming on Challenges in Image Analysis and Understanding," Arlington, Mar. 2007.

238. "Sparse solutions to underdetermined linear systems." Invited talk, Sparse Approximation Workshop, Princeton, Nov. 2006.

239. "One sketch for all: A sublinear approximation scheme for heavy hitters." Invited talk, Workshop on Algorithms for Modern Massive Data Sets, Stanford Univ., Palo Alto, June 2006.

240. "Sublinear algorithms for Compressed Sensing." Invited talk, session on "Compressive Sensing," SPIE Intelligent Integrated Microsystems, Orlando, Apr. 2006.

241. "Sublinear algorithms for Compressed Sensing." Invited talk, IEEE Conf. Information Systems and Sciences, Princeton, Mar. 2006.

242. "Average-case analysis of greedy pursuit." Invited talk, SPIE Wavelets XI, San Diego, Aug. 2005.

243. "Complex equiangular tight frames." SPIE Wavelets XI, San Diego, Aug. 2005.

244. "Signal recovery from random measurements." Invited talk, special semester on Time–Frequency Analysis, Erwin Schrödinger Inst., Vienna, June 2005.

245. "Signal recovery from partial information." Sparse Representation Workshop, CSCAMM, Univ. Maryland at College Park, May 2005.

246. "Simultaneous sparsity." Invited talk, special session "Sparse representations in signal processing." IEEE Int. Conf. Acoustics, Speech, and Signal Processing, Philadelphia, Mar. 2005.

247. "Convex programming methods for subset selection and sparse approximation." 2nd Int. Conf. Computational Harmonic Analysis, Vanderbilt Univ., Nashville, May 2004.

248. "Equiangular tight frames." Invited talk, special session "Designing frames and wavelets: From theory to digitization," 6th Joint Meeting of the AMS and SMM, Houston, May 2004.

249. "Convex programming methods for subset selection and sparse approximation." Recent Developments in Applied Harmonic Analysis Workshop, Univ. Arkansas at Fayetteville, May 2004.

250. "Improved sparse approximation over quasi-incoherent dictionaries." Invited talk, special session "Redundant representations in image processing," IEEE Int. Conf. Image Processing, Barcelona, Sep. 2003.

251. "Optimal CDMA signature sequences, inverse eigenvalue problems, and alternating minimization." IEEE Int. Symp. Information Theory, Yokohoma, July 2003.

252. "An algorithmic approach to sparse time–frequency analysis." Ideal Data Representation (IDR) Workshop, Columbia, SC, Nov. 2002.

GUEST LECTURES

253. "Finding structure with randomness." Introduction to Applied and Computational Mathematics (ACM 10) course, California Inst. Tech., Nov. 2012.

254. "Finding structure with randomness." Introduction to Applied and Computational Mathematics (ACM 10) course, California Inst. Tech., Nov. 2011.

255. "Compressive sampling [Aerial view]." Introduction to Applied and Computational Mathematics (ACM 10) course, California Inst. Tech., Nov. 2010.

256. "Compressive sampling [Aerial view]." Introduction to Applied and Computational Mathematics (ACM 10) course, California Inst. Tech., Nov. 2009.

257. "Greed is good: Algorithmic Results for Sparse Approximation." Compressed Sensing course, Electrical Engineering Dept., Rice Univ., Jan. 2006.

258. "Extreme singular values of Gaussian matrices." Measure Concentration course, Mathematics Dept., Univ. Michigan at Ann Arbor, Apr. 2005.

259. "An introduction to equiangular tight frames." Groups and Lattices study group, Mathematics Dept., Univ. Michigan at Ann Arbor, Dec. 2004.

260. "Galerkin's Method for nonlinear, compact fixed-point problems." Nonlinear Functional Analysis course, Mathematics Dept., Univ. Texas at Austin, Dec. 2000.

261. "The Cone Theorem." Nonlinear Functional Analysis course, Mathematics Dept., Univ. Texas at Austin, Oct. 2000.

262. "Flow around a symmetric obstacle." Nonlinear Functional Analysis course, Mathematics Dept., Univ. Texas at Austin, Sep. 2000.

OTHER LECTURES

263. "Finding structure with randomness." IST Advisory Board Meeting, California Inst. Tech., Pasadena, Nov. 2010.

264. "Uncertainty principles meet linear algebra." Undergraduate Math Club, Mathematics Dept., Univ. Michigan at Ann Arbor, Feb. 2006.