

# Justin G. Chen, Ph.D

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CONTACT INFORMATION	33 Hayward Avenue Lexington, MA 02421 website: <a href="http://people.csail.mit.edu/ju21743/">http://people.csail.mit.edu/ju21743/</a>	phone: (626) 235-2666 e-mail: <a href="mailto:ju21743@mit.edu">ju21743@mit.edu</a> e-mail: <a href="mailto:justgchen@gmail.com">justgchen@gmail.com</a>
RESEARCH INTERESTS	Novel sensor systems, computer vision, machine learning, vibration analysis, laser vibrometry, time series analysis, non-destructive testing, structural health monitoring, internet of things.	
EDUCATION	<b>Massachusetts Institute of Technology</b> , Cambridge, MA <i>Ph.D, Civil and Environmental Engineering, Structures and Materials</i> <b>June 2016</b> <b>Thesis:</b> Video Camera-based Vibration Measurement of Infrastructure <b>Advisor:</b> Oral Buyukozturk <ul style="list-style-type: none"><li>Built a system using commodity cameras and computer vision algorithms (Motion Magnification) to visualize and measure vibrational mode shapes and displacements of structures and objects up to 100x faster and 10 better resolution than current video-based methods</li><li>Characterized and compared the methodology to traditional sensors with measurements in the laboratory as well as on real structures, including a bridge in Portsmouth, NH</li><li>Worked with machine learning and damage detection algorithms for structural monitoring</li><li>See this YouTube video for an explanation of my thesis work: <a href="https://youtu.be/0GiVsiBSWmw">https://youtu.be/0GiVsiBSWmw</a></li></ul> <b>Master of Science, Civil and Environmental Engineering</b> <b>February 2013</b> <b>Thesis:</b> Detection of Defects in FRP-Reinforced Concrete with the Acoustic-Laser Vibrometry Method <b>Advisors:</b> Oral Buyukozturk and Robert Haupt <ul style="list-style-type: none"><li>Worked with an acoustic-laser vibrometry system to remotely detect defects in FRP-reinforced concrete</li><li>Characterized system performance under varying measurement and defect parameters to quantify the effects on signal amplitude, noise floor, and ROC curve to define specifications for a fieldable system</li></ul> <b>California Institute of Technology</b> , Pasadena, CA <i>Bachelor of Science, Physics</i> <b>December 2008</b>	
PROFESSIONAL EXPERIENCE	<b>MIT Lincoln Laboratory</b> , Lexington, MA <i>Technical Staff, Advanced Capabilities and Technologies, Group 91</i> <b>June 2017 – Present</b> <ul style="list-style-type: none"><li>Developed novel algorithms for extracting faint signals from noisy data.</li><li>Worked with and adapted deep learning and computer vision algorithms.</li></ul> <b>Massachusetts Institute of Technology</b> , Cambridge, MA <i>Post-doctoral Associate, Laboratory for Infrastructure Science and Sustainability</i> <b>June 2016 – June 2017</b> <ul style="list-style-type: none"><li>Continued work into using computer vision algorithms for vibration measurement.</li><li>Explored commercialization opportunities under a Deshpande Center grant and the StartMIT workshop.</li></ul> <b>MIT Lincoln Laboratory</b> , Lexington, MA <i>Assistant Staff, Active Optical Systems, Group 106</i> <b>May 2009 – August 2010</b> <ul style="list-style-type: none"><li>Assisted in the development of a laser vibrometry system on a moving ground platform</li><li>Performed vibration analysis and worked with fiber-optic system and accelerometer data acquisition</li></ul>	
SKILLS	<b>Software:</b> MATLAB, TensorFlow, Python, LabVIEW, Abaqus, ADINA <b>Experimental:</b> Data acquisition, laser vibrometry, high-speed cameras, accelerometers, performance driving	
SELECTED PUBLICATIONS	<b>Chen, J.G.</b> , N. Wadhwa, Y.-J. Cha, F. Durand, W.T. Freeman, O. Buyukozturk, “Modal identification of simple structures with high-speed video using motion magnification,” <i>Journal of Sound and Vibration</i> , Vol. 345, pp. 58-71, 2015. Davis, A., <b>J. G. Chen</b> , and F. Durand. “Image-Space Modal Bases for Plausible Manipulation of Objects in Video,” <i>ACM Transaction on Graphics (TOG)</i> , Vol. 34, no. 6, p. 239. <b>Chen, J.G.</b> , R.W. Haupt, and O. Buyukozturk, “Operational and defect parameters concerning the acoustic-laser vibrometry method for FRP-reinforced concrete,” <i>NDT &amp; E International</i> , Vol. 71, pp. 43-53, 2015. O. Buyukozturk, W. T. Freeman, F. Durand, M. A. Davis, N. Wadhwa, and <b>J. G. Chen</b> , “Video-based identification of operational mode shapes.” US Patent Application 15/012,835.	
AWARDS AND LEADERSHIP	Shell - MIT Energy Fellow, 2012 - 2013, 2016 - 2017 100k Launch Competition Semi-Finalist, 100k Pitch Competition Finalist, 2015 - 2016 MIT Civil and Environmental Engineering Department, Graduate Committee, 2013 - 2015 American Society for Nondestructive Testing Fellowship Award, 2011 Harvey Schoettler Fellowship, 2010 - 2011	
INTERESTS	Autocross, skiing, poi fire spinning, gymnastics, longboarding, cello, piano	