

Jeffrey L Caplan, PhD

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EDUCATION

2008-2009 Postdoctoral Researcher, Department Mol., Cell. & Dev. Biology and Yale Center for Genomics and Proteomics, Yale University in New Haven, CT
2002-2008 PhD, Department Mol., Cell. & Dev. Biology, Yale University in New Haven, CT
1997-2002 BS, *Summa cum laude*, Horticulture, U. of Connecticut, Storrs, CT
1997-2001 BS, *Summa cum laude*, Mol. & Cell Biology, U. of Connecticut, Storrs, CT

PROFESSIONAL POSITIONS

2018-present **Associate Professor**, Department of Plant and Soil Sciences, University of Delaware
2014-present **Co-Director**, Centralized Research Instrumentation Core, INBRE, University of Delaware
2013-present **Director**, Bio-Imaging Center, Delaware Biotechnology Institute, University of Delaware
2013-2018 **Assistant Professor** (affiliated), Department of Biological Sciences, University of Delaware
2009-2018 **Research Assistant Professor** (affiliated), Department of Plant and Soil Sciences, University of Delaware
2009-2013 **Associate Director**, Bio-Imaging Center, Delaware Biotechnology Institute, University of Delaware

AREAS OF SPECIALIZATION

- The role of chloroplasts and their stromule extensions during plant innate immunity.
- Development of microscopy techniques for three-dimensional imaging, live-cell plant dynamics, and small RNA detection.

AWARDS AND HONORS

2012 Research Summit Award, Delaware INBRE
2008 John Spangler Nicholas Prize, Outstanding thesis award, Department of Molecular, Cellular, and Developmental Biology, Yale University
2006 Poster prize, Department of Molecular, Cellular, and Developmental Biology, Yale University
1997-2001 Presidential Leadership Scholarship, University of Connecticut

SCHOLARSHIP

Google Scholar: 2243 total citations, h-index 23 as of July 2, 2018
Scholarly publications (57), including book chapters for career (2003-2018)

Peer-reviewed publications from the past four years

(* indicates corresponding)

1. Yu X, Noll RR, Romero Duenas BP, Allgood SC, Barker K, **Caplan JL**, Machner MP, LaBaer J, Qiu J, Neunuebel MR. Legionella effector AnkX interacts with host nuclear protein PLEKHN1. BMC Microbiol. 2018;18(1):5. doi: 10.1186/s12866-017-1147-7. PubMed; PMCID: [PMC5809941](https://pubmed.ncbi.nlm.nih.gov/30000000/).
2. Hudson DA, **Caplan JL**, Thorpe C. Designing Flavoprotein-GFP Fusion Probes for Analyte-Specific Ratiometric Fluorescence Imaging. Biochemistry. 2018;57(7):1178-89. doi: 10.1021/acs.biochem.7b01132. PMCID: [PMC5820181](https://pubmed.ncbi.nlm.nih.gov/30000000/).
3. Minker KR, Biedrzycki ML, Kolagunda A, Rhein S, Perina FJ, Jacobs SS, Moore M, Jamann TM, Yang Q, Nelson R, Balint-Kurti P, Kambhamettu C, Wisser RJ*, **Caplan JL***. 2018. Semiautomated confocal imaging of fungal pathogenesis on plants: Microscopic analysis of macroscopic specimens. Microsc Res Tech. Feb;81(2):141-152. doi: 10.1002/jemt.22709 PMID: [27342138](https://pubmed.ncbi.nlm.nih.gov/30000000/).

4. Kumar AS, Park E, Nedo A, Alqarni A, Ren L, Hoban K, Modla S, McDonald JH, Kambhamettu C, Dinesh-Kumar SP, Caplan JL. Stromule extension along microtubules coordinated with actin-mediated anchoring guides perinuclear chloroplast movement during innate immunity. *Elife*. 2018;7. Epub 2018/01/18. doi: 10.7554/eLife.23625. PMCID: [PMC5815851](#).
5. Park E, Nedo A, **Caplan JL***, Dinesh-Kumar SP. Plant-microbe interactions: organelles and the cytoskeleton in action. *New Phytol*. 2017 Dec 18. Doi: 10.1111/nph.14959. PMID [29250789](#).
6. Huang K, Doyle F, Wurz ZE, Tenenbaum SA, Hammond RK, **Caplan JL***, Meyers BC*. FASTmiR: an RNA-based sensor for in vitro quantification and live-cell localization of small RNAs. *Nucleic Acids Res*. 2017 Aug 21;45(14):e130. doi: 10.1093/nar/gkx504. PMID: [28586459](#).
7. Yang Q, He Y, Kabahuma M, Chaya T, Kelly A, Borrego E, Bian Y, El Kasmi F, Yang L, Teixeira P, Kolkman J, Nelson R, Kolomiets M, L Dangl J, Wisser R, **Caplan J**, Li X, Lauter N, Balint-Kurti P. A gene encoding maize caffeoyl-CoA O-methyltransferase confers quantitative resistance to multiple pathogens. *Nat Genet*. 2017 Sep;49(9):1364-1372. doi: 10.1038/ng.3919. Epub 2017 Jul 24. PMID: [28740263](#).
8. Liang H, DeMeester KE, Hou CW, Parent MA, **Caplan JL**, Grimes CL. Metabolic labelling of the carbohydrate core in bacterial peptidoglycan and its applications. *Nat Commun*. 2017 Apr 20;8:15015. doi: 10.1038/ncomms15015. PMID: [28425464](#).
9. Pokrzywinski KL, Tilney CL, Modla S, **Caplan JL**, Ross J, Warner ME, Coyne KJ. Effects of the bacterial algicide IRI-160AA on cellular morphology of harmful dinoflagellates. *Harmful Algae*. 2017 Feb;62:127-135. doi: 10.1016/j.hal.2016.12.004. Epub 2017 Jan 16. PMID: [28118887](#).
10. Lu G, Ren L, **Caplan J**, Kambhamettu C, stromule branch tip detection based on accurate cell image segmentation. *IEEE SigPort*, 2017. <http://sigport.org/1807>.
11. Saponaro P, Treible W, Kolagunda A, Chaya T, Caplan J, Kambhamettu C, Wisser R. DeepXScope: Segmenting microscopy images with a deep neural network. *CVPR*. 2017. [Open access](#).
12. Saponaro P, Treible W, Kolagunda A, Chaya T, Caplan J, Kambhamettu C, Wisser R. Three-dimensional segmentation of vesicular networks of fungal hyphae in macroscopic microscopy image stacks. *ICIP*. 2017. [arXiv:1704.02356](https://arxiv.org/abs/1704.02356).
13. Dong Z, Shanmughapriya S, Tomar D, Siddiqui N, Lynch S, Nemani N, Breves SL, Zhang X, Tripathi A, Palaniappan P, Riitano MF, Worth AM, Seelam A, Carvalho E, Subbiah R, Jaña F, Soboloff J, Peng Y, Cheung JY, Joseph SK, **Caplan J**, Rajan S, Stathopoulos PB, Madesh M. Mitochondrial Ca²⁺ Uniporter Is a Mitochondrial Luminal Redox Sensor that Augments MCU Channel Activity. *Mol Cell*. 2017 Mar 16;65(6):1014-1028.e7. doi 10.1016/j.molcel.2017.01.032. Epub 2017 Mar 2. PMID: [28262504](#).
14. Black K, Petruk S, Fenstermaker TK, Hodgson JW, **Caplan JL**, Brock HW, Mazo A. Chromatin proteins and RNA are associated with DNA during all phases of mitosis. *Cell Discov*. 2016 Oct 25;2:16038. eCollection 2016. PMID: [27807477](#).
15. Huang K, **Caplan J**, Sweigard J, Czymmek K, Donofrio N. 2016. Optimization of the HyPer sensor for robust real-time detection of hydrogen peroxide in the rice blast fungus. *Mol Plant Pathol*. PMID: [26950262](#).
16. Tomar D, Dong Z, Shanmughapriya S, Koch DA, Thomas T, Hoffman NE, Timbalia SA, Goldman SJ, Breves SL, Corbally DP, Nemani N, Fairweather JP, Cutri AR, Zhang X, Song J, Jana F, Huang J, Barrero C, Rabinowitz JE, Luongo TS, Schumacher SM, Rockman ME, Dietrich A, Merali S, **Caplan J**, Stathopoulos P, Ahima RS, Cheung JY, Houser SR, Koch WJ, Patel V, Gohil VM, Elrod JW, Rajan S, Madesh M. 2016. MCUR1 Is a Scaffold Factor for the MCU Complex Function and Promotes Mitochondrial Bioenergetics. *Cell Rep* 15(8): 1673-85. PMCID: [PMC4880542](#).
17. Szczesny SE, **Caplan JL**, Pedersen P, Elliott DM. Quantification of Interfibrillar Shear Stress in Aligned Soft Collagenous Tissues via Notch Tension Testing. *Sci Rep*. 2015 Oct 15;5:14649. PMCID: [PMC4606738](#).
18. **Caplan JL***, Kumar AS, Park E, Padmanabhan MS, Hoban K, Modla S, Czymmek K, Dinesh-Kumar SP.* (2015). Chloroplast Stromules Function during Innate Immunity. *Dev Cell* 34, 45–57. PMCID: [PMC4596411](#).
19. Lai X, Price C, Modla S, Thompson WR, **Caplan J**, Kirn-Safran CB, Wang L. 2015. The dependences of osteocyte network on bone compartment, age, and disease. *Bone Res* 3. PMID: [26213632](#).
20. Al-Dossary AA, Bathala P, **Caplan JL**, Martin-DeLeon PA. Oviductosome-Sperm Membrane Interaction in Cargo Delivery: Detection Of Fusion And Underlying Molecular Players Using Three-Dimensional Super-Resolution Structured Illumination Microscopy (Sr-SIM). *J Biol Chem*. 2015 Jul 17;290(29):17710-23. PMCID: [PMC4505020](#).

21. Monillas ES, **Caplan JL**, Thévenin AF, Bahnson BJ. Oligomeric state regulated trafficking of human platelet-activating factor acetylhydrolase type-II. *Biochim Biophys Acta*. 2015 May;1854(5):469-75. PMID: [PMC4380869](#).
22. Gangadharan V, Nohe A, **Caplan J**, Czymmek K, Duncan RL. Caveolin-1 regulates P2X7 receptor signaling in osteoblasts. *Am J Physiol Cell Physiol*. 2015 Jan 1;308(1):C41-50. PMID: [PMC4281673](#).
23. Modla S, **Caplan JL**, Czymmek KJ, Lee JY. Localization of fluorescently tagged protein to plasmodesmata by correlative light and electron microscopy. *Methods Mol Biol*. 2015;1217:121-33. PubMed PMID: [25287200](#).

PRESENTATIONS

Plenary talk

2017 “Stromule-directed chloroplast movement during plant immunity: does the tail wag the dog?”, Botanikertagung, Kiel Germany

Invited talks

2018 “The Bio-Imaging Center: A state-of-the art core facility for advanced microscopy”, DDOE High School Teachers’ Workshop, University of Delaware

2018 “Seeing is believing: subcellular dynamics during plant innate immunity”, University of Delaware

2018 “Stromule-directed chloroplast movement during plant immunity: does the tail wag the dog?”, University of Pennsylvania

2018 “The DBI Bio-Imaging Center: A highly accessible resource for advanced microscopy”. DelawareBio Biobreakfast, University of Delaware

2017 “Shedding light on the role of chloroplast dynamics during plant innate immunity”, University of Delaware

2016 “Chloroplast stromules: the formation and functioning during plant innate immunity”, Donald Danforth Center, St. Louis

2016 “Chloroplast stromules: the formation and functioning during plant innate immunity”, The 17th Annual Plant Biology Mini-Symposium, University of Maryland.

2016 “The Bio-Imaging Center at the Delaware Biotechnology Institute: a core facility for electron, light and atomic force microscopy”, OSCAR Center, Delaware State University

2015 “Correlative Microscopy: Biological Applications and Approaches”, Carl Zeiss, NY

2014 “Nobel Prize in Chemistry Eric Betzig, Stefan W. Hell & William E. Moerner” Nobel Prize Symposium, University of Delaware

Keynote

2016 Keynote speaker: “Microscopy: playing at the intersection of art and science”, Art in Science, Interdisciplinary Science and Engineering Laboratory, University of Delaware

Seminar series

2016 “Chloroplast stromules: the formation and functioning during plant innate immunity”, Department of Plant and Soil Sciences, University of Delaware

2015 “The DBI Bio-Imaging Center: A highly accessible resource for advanced microscopy techniques at UD”, Animal and Food Sciences, University of Delaware

PATENTS

2015 Jackson G, Caplan J, Huang K, Meyers B. Methods and materials for sensitive detection of target molecules. *Pending*.

SELECTED EXTRAMURAL AWARDS

2018-2021 Caplan (PI). \$299,920, qRNA-PAINT as a method for high-throughput, quantitative, single molecule analysis of cellular RNAs and their networks, NSF-IOS/EAGER

2011-2018 Dinesh-Kumar (m-PI), Caplan (m-PI). \$934,203 (subaward), Study of chloroplast stromules during PCD and inter-organellar communication. NIH-NIGMS/R01

2018 Caplan (PI). \$600,000, Serial Block Face Scanning Electron Microscope, NIH-NIGMS/S10