

John E. McLaughlin

Education

- 2006 **PhD**, *University of Minnesota*, St. Paul, MN,
Cytogenetics
- 1997 **MS**, *University of Minnesota*, St. Paul, MN,
Plant Genetics
- 1993 **BS**, *Moravian College*, Bethlehem, PA,
Major: Biology, Minor: Chemistry

Experience

Professional

- 2025–present **Research Scientist**, *Rutgers University*, New Brunswick, NJ, Drug discovery, plant-fungal interaction, hemp fiber research in Professor Nilgun Tumer's and James Simon's laboratories
Detailed achievements:
- Identified a novel four eight-cysteine domain nsLTP protein.
- 2019–2025 **Assistant Research Professor**, *Rutgers University*, New Brunswick, NJ
Drug discovery and plant-fungal interaction research in Professor Nilgun Tumer's laboratory
Detailed achievements:
- Screened and characterized small molecule inhibitors targeting the P-stalk binding pocket of ricin and Stx2
 - Designed and applied binding assays to quantify small-molecule and peptide inhibitors, including the design and application of binding assays (e.g., fluorescence anisotropy-based competition assays) to quantify binding affinities and study molecular interactions
 - Cultured mammalian cells and performed microscopic phenotyping in response to ribotoxin exposure
 - Viability assays via flow cytometry and CellTiter-Glo ATP determinations
 - Depurination assays via RT-qPCR
 - Served as both Biosafety and Radiation Safety Officer for the Tumer laboratory, overseeing radiation safety protocols, compliance, and the safe handling and disposal of radioactive materials.
 - Fungal and plant exosome isolation and characterization
 - Advanced experience in isolating and characterizing fungal and plant exosomes using differential centrifugation
 - Purification of heterogeneous vesicles by Optiprep density gradients
 - Apoplastic fluid and exosome proteomics
 - Identified novel pathogen-host interaction proteins
 - Identified chloroplast UPR as a protective mechanism upon trichothecene exposure in *Chlamydomonas*
 - Chemical genomics
 - Genome-wide screen of mutants sensitive to trichothecenes (deep sequencing)
 - RNAseq analysis confirming mutant screen
 - Identification of functional orthologs in *Arabidopsis*
 - Industrial microbiology project with Chobani
 - Mutant screens in *Komagataella phaffii* to isolate high-yield protein secretion strains
 - Identified mutant and media combination that resulted in 10X protein expression
 - Hemp agronomy and fiber harvest/retting
 - Hemp fibers analysis for construction, textiles, plastic replacement
 - Stem histology, decortication, microscopic fiber analysis, and NIR analysis
 - Fiber heterogeneity analysis using segmentation tools in **FIJI**

- 2012-2019 **Research Associate**, *Rutgers University*, New Brunswick, NJ
 nsLTP characterization, transgenic plant work, mitophagy characterization (Dr. Nilgun Tumer)
 Detailed achievements:
- Characterized the non-specific lipid transfer protein AtLTP4.4, demonstrating its antifungal and ROS-scavenging activities
 - Expression of nsLTP in *Komagataella phaffii*/zone of inhibition fungal assays
 - Lipidomics of *Arabidopsis* treated with trichothecenes
 - Trichothecenes found to induce the accumulation of Arabidopside D and oxidized acylated MGDGs
 - Successfully generated and tested transgenic wheat and barley (field and greenhouse) for resistance to *Fusarium graminearum* and mycotoxin accumulation
- 2010-2012 **Research Assistant**, *Rutgers University*, New Brunswick, NJ
 Plant resistance gene identification and small-molecule ricin inhibitor screening (Dr. Nilgun Tumer)
 Detailed achievements:
- Activation tagged *Arabidopsis* mutant screen
 - Cell-free translation assays using yeast and rabbit lysate to study the impact of small-molecule inhibitors
- 2007-2009 **Postdoctoral Associate**, *Rutgers University*, New Brunswick, NJ
 Functional genomics using yeast (Dr. Nilgun Tumer)
 Detailed achievements:
- Yeast chemical genetics
 - Identified that trichothecenes impact mitochondrial dynamics (fission/fusion)
 - Utilized radiolabeling techniques for *in vivo* and *in organello* assays protein translation assays
- 1999-2003 **Research Associate**, *University of Delaware*, Lewes, DE
 Maize stress physiology (Dr. John Boyer)
 Detailed achievements:
- Molecular and physiological analysis of maize ovary/kernel abortion
 - Invertase localization (*In vivo* and *In situ*)
 - Sucrose processing gene quantification
- 1993-1999 **Research Assistant**, *University of Minnesota*, St. Paul, MN
 Maize cytogenetics and quantitative genetics (Drs. Ronald Phillips and Friedrich Srienc)
 Detailed achievements:
- Mapped and characterized maize flowering time QTLs using NILs
 - Cytogenetic analysis of maize endosperm development; identified and characterized endosperm cell number and endoreduplication QTLs
 - Southern blotting with radiolabeled probes for genetic analysis

Teaching

Co-Instructor	Plant Pathogenesis 16:765:538 (2009-present)	<i>Topics: Chemical genomics and host-induced gene silencing, functional genomics.</i>
Guest lecturer	Concepts in Biotechnology and Genomics 16:137:615 (2011-present)	<i>Functional genomics</i>
Co-Instructor	Natural Products and Human Health 16:765:540 (2021-present)	<i>Impact of mycotoxins on plant and human health; Industrial microbiology</i>
Mentor	Aresty and SUPER program for Douglass STEM programs (2009-present)	<i>Yeast genetics, Chlamydomonas genetics, industrial microbiology</i>
Mentor	Liberty Science Center Partners in Science program (2022-present)	<i>Chlamydomonas genetics</i>
Co-Instructor	Advanced Plant Breeding 16:765:528 (2015-present)	<i>Quantitative genetics, advanced statistics</i>
Co-Instructor	Plant Breeding 11:776:406/16:765:529 (2022)	<i>Plant genetics, cytogenetics</i>
Guest lecturer	Plant Biology 16:765:501 (2012)	<i>Topics: Plant-fungal interactions.</i>
Instructor	SEBS Portals for Academic Success 11:015:113 (2011-2012)	<i>Time management and study skills</i>
Guest lecturer	Science Park High School (Newark, NJ) (2011-2014)	<i>Yeast genetics and functional genomics</i>
TA	University of Minnesota (1998)	<i>Experimental design and statistics</i>
TA	University of Minnesota (1996)	<i>Graduate cytogenetics laboratory</i>

Professional Development and Service

- Member Provost's Teaching Fellows Program (Rutgers Institute for Teaching, Innovation, & Inclusive Pedagogy) (2025-2026)
- Member Graduate Program in Cell and Developmental Biology at Rutgers (2024-present)
- Member Rutgers Hemp Program (2023-present)
- Member Rutgers Center for Lipid Research (2021-present)
- Member Rutgers Institutional Biosafety Committee (2015-present)
- Panelist NSF/NIFA Plant-Biotic Interactions Grant Panel (2022)
- Member SEBS Diversity, Communications, and Philanthropy Committee (2016-2020)
- Student Cold Spring Harbor Yeast Genetics Course (2008)
- Student Biacore Basics Course, GE Healthcare (2007)
- Student NIH Biotechnology Trainee (1995-1998)
- Student Bioethics/Responsible and Successful Conduct of Research Short Course (1997)
- Student Metabolic Flux Analysis Short Course, University of Minnesota (1995)

Presentations

- 2016-2025 Microbiology Symposium (Rutgers Department of Biochemistry and Microbiology) *Posters*
- 2024 International Plant Proteostasis Conference *Poster*
- 2024 Focus on Fiber Symposium (Rutgers Hemp Program) *Organizer and Speaker*
- 2024 Lipids in Membrane Organization and Translational Medicine (Rutgers Center for Lipid Research) *Poster*
- 2010, 2017 Annual Meeting of the National Fusarium Head Blight Forum *Invited Speaker*
- 2009-present Annual Meeting of the National Fusarium Head Blight Forum *Posters*
- 2022-2025 Annual Rutgers Turfgrass Symposium *Posters*
- 2015, 2017, 2019 Mycotoxins and Phycotoxins Gordon Conference *Posters*
- 2010 A genome-wide screen in *Saccharomyces cerevisiae* to identify the genes that mediate cytotoxicity of ricin (NIH Trans RCE Workshop on Toxins, The Uniformed Services University, Bethesda, Maryland) *Invited Speaker*

Publications

John E. McLaughlin, Michael J. Rudolph, Arkajyoti Dutta, Xiao-Ping Li, Anastasiia M. Tsymbal, Yang Chen, Shibani Bhattacharya, Benjamin Algava, Michael Goger, Jacques Y. Roberge, and Nilgun E. Tumer. Binding of small molecules at the P-stalk site of ricin A subunit trigger conformational changes that extend into the active site. *Journal of Biological Chemistry*, page 108310, 2025. PMID: 39955060.

Stephen Komar, William Bamka, and John E McLaughlin. Assessing the feasibility of hemp for fiber production in the northeastern United States. *Crops & Soils*, 2025. <https://www.sciencesocieties.org/print/pdf/node/466>.

Arkajyoti Dutta, Zoltan Szekely, Hakan Guven, Xiao-Ping Li, John E McLaughlin, and Nilgun E Tumer. A fluorescence anisotropy-based competition assay to identify inhibitors against ricin and Shiga toxin ribosome interactions. *Analytical Biochemistry*, page 115580, 2024. PMID: 38825159.

Michael J. Rudolph, Arkajyoti Dutta, Anastasiia M. Tsymbal, John E. McLaughlin, Yang Chen, Simon A. Davis, Sophia A. Theodorou, Michael Pierce, Benjamin Algava, Xiaoyu Zhang, Zoltan Szekely, Jacques Y. Roberge, Xiao-Ping Li, and Nilgun E. Tumer. Structure-based design and optimization of a new class of small molecule inhibitors targeting the P-stalk binding pocket of ricin. *Bioorganic & Medicinal Chemistry*, 100:117614, 2024. PMID: 38340640.

John E. McLaughlin, Noura I. Darwish, Jeffrey Garcia-Sanchez, Neerja Tyagi, Harold N. Trick, Susan McCormick, Ruth Dill-Macky, and Nilgun E. Tumer. A lipid transfer protein has antifungal and antioxidant activity and suppresses Fusarium Head Blight disease and DON accumulation in transgenic wheat. *Phytopathology*, 111(4):671–683, 2021. PMID: 32896217.

Michael Pierce, Diana Vengsarkar, John E. McLaughlin, Jennifer N. Kahn, and Nilgun E. Tumer. Ribosome depurination by ricin leads to inhibition of endoplasmic reticulum stress-induced HAC1 mRNA splicing on the ribosome. *The Journal of Biological Chemistry*, 294:17848–17862, Nov 2019. PMID: 31624149.

Yijun Zhou, Xiao-Ping Li, Jennifer N. Kahn, John E. McLaughlin, and Nilgun E. Tumer. Leucine 232 and hydrophobic residues at the ribosomal P stalk binding site are critical for biological activity of ricin. *Biosci Rep*, 39(10):BSR20192022, October 2019. PMID: 31548364.

John E. McLaughlin, Mohamed Anwar Bin-Umer, Thomas Widiez, Daniel Finn, Susan McCormick, and Nilgun E. Tumer. A lipid transfer protein increases the glutathione content and enhances Arabidopsis resistance to a trichothecene mycotoxin. *PLOS ONE*, 10(6):1–20, 06 2015. PMID: 26057253.

Mohamed Anwar Bin-Umer, John E. McLaughlin, Matthew S. Butterly, Susan McCormick, and Nilgun E. Tumer. Elimination of damaged mitochondria through mitophagy reduces mitochondrial oxidative stress and increases tolerance to trichothecenes. *Proceedings of the National Academy of Sciences*, 111(32):11798–11803, 2014. PMID: 25071194.

Mohamed Anwar Bin-Umer, John E. McLaughlin, Debaleena Basu, Susan McCormick, and Nilgun E. Tumer. Trichothecene mycotoxins inhibit mitochondrial translation—implication for the mechanism of toxicity. *Toxins*, 3(12):1484–1501, 2011. PMID: 22295173.

Yuan-Ping Pang, Jewn Giew Park, Shaohua Wang, Anuradha Vummenthala, Rajesh K. Mishra, John E. McLaughlin, Rong Di, Jennifer Nielsen Kahn, Nilgun E. Tumer, Laszlo Janosi, Jon Davis, and Charles B. Millard. Small-molecule inhibitor leads of ribosome-inactivating proteins developed using the doorstep approach. *PLOS ONE*, 6(3):1–15, 03 2011. PMID: 21455295.

John E. McLaughlin, Mohamed Anwar Bin-Umer, Andrew Tortora, Natasha Mendez, Susan McCormick, and Nilgun E. Tumer. A genome-wide screen in *Saccharomyces cerevisiae* reveals a critical role for the mitochondria in the toxicity of a trichothecene mycotoxin. *Proceedings of the National Academy of Sciences*, 106(51):21883–21888, 2009. PMID: 20007368.

John S. Boyer and John E. McLaughlin. Functional reversion to identify controlling genes in multigenic responses: analysis of floral abortion. *Journal of Experimental Botany*, 58(2):267–277, 11 2006. PMID: 17105969.

Pirjo Mäkelä, JE McLaughlin, and JS Boyer. CFDA as a tracer to image carbohydrate transport to the developing kernels of maize grown under drought or shade. *Comparative Biochemistry and Physiology. Part A: Molecular & Integrative Physiology*, 141:S312–S312, 2005.

John E. McLaughlin and John S. Boyer. Glucose localization in maize ovaries when kernel number decreases at low water potential and sucrose is fed to the stems. *Annals of Botany*, 94(1):75–86, 07 2004. PMID: 15159218.

John E. McLaughlin and John S. Boyer. Sugar-responsive gene expression, invertase activity, and senescence in aborting maize ovaries at low water potentials. *Annals of Botany*, 94(5):675–689, 09 2004. PMID: 15355866.

Cristian Vlăduțu, John McLaughlin, and Ronald L Phillips. Fine mapping and characterization of linked quantitative trait loci involved in the transition of the maize apical meristem from vegetative to generative structures. *Genetics*, 153(2):993–1007, 10 1999. PMID: 10511573.