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Dr. Zhenyu Cheng

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NSERC CRSNG

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Dr. Zhenyu Cheng

Language Skills

Language	Read	Write	Speak	Understand	Peer Review
English	Yes	Yes	Yes	Yes	Yes
French	No	No	No	No	No
Mandarin Chinese	Yes	Yes	Yes	Yes	Yes

Degrees

- 2010/10 — Doctorate, Microbiology, University of Waterloo
  Supervisors: Bernard Glick and Brendan McConkey, 2006/5 - 2010/9
- 2004/8 — Master's Thesis, Microbiology, University of Waterloo
  Supervisors: Bernard Glick, 2002/9 - 2004/8
- 2002/6 — Bachelor's, Virology, Wuhan University

Recognitions

2018/5 - 2018/5
Faculty of Medicine Award for Excellence in Medical Research
Dalhousie Medical Research Foundation
Prize / Award
This award has been created to acknowledge research excellence among faculty members within Dalhousie's Faculty of Medicine and to encourage their continued efforts in medical research.

2016/4 - 2018/3
Marsha Morton Early Career Investigator Award - 196,680
Cystic Fibrosis Canada
Prize / Award
I am the holder of the Marsha Morton Early Career Investigator Award from Cystic Fibrosis Canada

2015/1 - 2015/12
Tosterson Award - 63,020
Harvard Medical School
Prize / Award
The first ranked postdoctoral award in Massachusetts General Hospital

2013/9 - 2014/8
Banting Fellowship - 140,000
Natural Sciences and Engineering Research Council of Canada (NSERC)
Prize / Award
The prestigious postdoctoral fellowship offered by Government of Canada

User Profile

Research Specialization Keywords: bacteria, cancer, host, innate immunity, interaction, pathogen, plant

Employment

2010/10 - 2015/12	Postdoctoral Fellow Genetics, Harvard Medical School, Harvard Medical School Full-time Tenure Status: Non Tenure Track
2004/9 - 2006/4	Research Technician Biology, Faculty of Science, University of Waterloo Full-time Tenure Status: Non Tenure Track

Research Funding History

Awarded [n=2]

2016/5 - 2021/4
Principal Applicant

Molecular Characterization of Plant-Bacterial Interactions, Grant

Funding Sources:
Natural Sciences and Engineering Research Council of Canada (NSERC)
Discovery Grant program
Total Funding - 180,000
Portion of Funding Received - 170,000
Funding Competitive?: Yes

2016/4 - 2019/3
Principal Applicant

Characterization of Pseudomonas aeruginosa antibiotic persistence mechanisms, Grant

Funding Sources:
Cystic Fibrosis Canada
Early Career Award
Total Funding - 196,680
Portion of Funding Received - 196,680
Funding Competitive?: Yes

Completed [n=9]

2018/9 - 2019/8
Co-applicant

Superresolution radial fluctuation microscope for 4D imaging of cells and cellular dynamics, Grant

Funding Sources:
Natural Sciences and Engineering Research Council of Canada (NSERC)
RTI
Total Funding - 86,118
Portion of Funding Received - 86,118
Funding Competitive?: Yes

Co-applicant : Craig McCormick; Jennifer Corcoran;

Principal Applicant : Graham Dellair

2017/9 - 2018/9
Principal Applicant

Eradication of Chronic Bacterial Infections in Cystic Fibrosis by Degrading Biofilms, Grant

Funding Sources:
Nova Scotia Health Research Foundation (NSHRF)
Catalyst Grant
Total Funding - 50,000
Portion of Funding Received - 100
Funding Competitive?: Yes

2017/7 - 2018/3
Principal Applicant

Probing Host-Bacterial Interactions Using Systems Biology Tools, Grant

Funding Sources:
Canada Foundation for Innovation (CFI)
John R Evans Leaders Fund
Total Funding - 353,089
Portion of Funding Received - 100
Funding Competitive?: Yes

2017/1 - 2017/12
Co-applicant

The Brandel Gradient Fractionator System, Grant

Funding Sources:
Dalhousie Medical Research Foundation (The)
Equipment Grant
Total Funding - 30,000
Portion of Funding Received - 30,000
Funding Competitive?: Yes

Co-applicant : Craig McCormick; Jennifer Corcoran; John Rohde;

Principal Applicant : Adrienne Weeks

2017/4 - 2017/12
Principal Applicant

Characterization of host-microbial interactions, Grant

Funding Sources:
Dalhousie Medical Research Foundation (The)
Equipment Grant
Total Funding - 28,910
Portion of Funding Received - 100
Funding Competitive?: Yes

2017/4 - 2017/9
Principal Applicant

Isolation of plant growth promoting reagents that boost plant host immunity, Grant

Funding Sources:
Natural Sciences and Engineering Research Council of Canada (NSERC)
Engage
Total Funding - 22,160
Portion of Funding Received - 100
Funding Competitive?: Yes

2016/9 - 2017/9
Principal Applicant

Characterization of the role of RACK1 in oncogenic-induced stress, Grant

Funding Sources:
Beatrice Hunter Cancer Research Institute (BHCRI)
Seed Grant
Total Funding - 10,000
Portion of Funding Received - 100
Funding Competitive?: Yes

2015/2 - 2016/1
Principal Investigator

Characterization of Pseudomonas aeruginosa proteins mediating host innate immunity, Fellowship

Funding Sources:
Massachusetts General Hospital
Tostenson Award
Total Funding - 63,020
Portion of Funding Received - 63,020
Funding Competitive?: Yes

2012/8 - 2014/7
Principal Investigator

Characterization of Pseudomonas aeruginosa proteins mediating host innate immunity, Fellowship

Funding Sources:
Natural Sciences and Engineering Research Council of Canada (NSERC)
Banting Postdoctoral Fellowship
Total Funding - 140,000
Portion of Funding Received - 140,000
Funding Competitive?: Yes

Principal Investigator : Zhenyu Cheng

Student/Postdoctoral Supervision

Bachelor's [n=2]

2016/5 - 2016/8
Principal Supervisor
Nicholas Boudrous (In Progress) , Dalhousie University
Student Degree Expected Date: 2019/10
Thesis/Project Title: cloning of cellulose degrading pathway
Present Position: continuing undergraduate study

2015/7 - 2015/8
Academic Advisor
Meera Ramakrishnan (In Progress) , California Institute of Technology
Student Degree Expected Date: 2018/6
Thesis/Project Title: Amplification of bacterial whole transcriptome for single cell RNA sequencing analysis
Present Position: undergraduate student

Bachelor's Honours [n=2]

2016/5 - 2017/4
Principal Supervisor
Emma Finlayson-Trick (In Progress) , Dalhousie University
Student Degree Expected Date: 2017/10
Thesis/Project Title: Construction of metagenomic library for functional screen
Present Position: graduate student

2016/1 - 2017/4
Principal Supervisor
Anna Duen-Sunn (In Progress) , Dalhousie University
Student Degree Expected Date: 2017/10
Thesis/Project Title: Screen of a *Pseudomonas aeruginosa* transposon mutant library to identify antibiotic persistence-related genes
Present Position: graduate student

Master's Thesis [n=1]

2016/5 - 2018/8
Principal Supervisor
Jamie Cook (Completed) , Dalhousie University
Thesis/Project Title: Getting to the root of plant infection: molecular characterization of plant response to *Pseudomonas aeruginosa* infection
Present Position: technician

Doctorate [n=4]

2018/6 - 2023/5
Principal Supervisor
Zheng Pang (In Progress) , Dalhousie University
Student Degree Expected Date: 2023/5
Thesis/Project Title: Dissecting mammalian host immune signaling pathways in response to *Pseudomonas aeruginosa* infection
Present Position: graduate student

2017/5 - 2024/12
Principal Supervisor
Yunnuo Shi (In Progress) , Dalhousie University
Student Degree Expected Date: 2024/1
Thesis/Project Title: Functional analyses of the role of RACK1 in proteome homeostasis
Present Position: graduate student

2017/1 - 2018/9 Academic Advisor	Toka Omar (In Progress) , Dalhousie University Thesis/Project Title: Investigation of the role of RACK1 in bacterial pathogen Present Position: graduate student
2016/1 - 2022/12 Principal Supervisor	Karla Valenzuela (In Progress) , Dalhousie University Student Degree Expected Date: 2022/12 Thesis/Project Title: Characterization of the role RACK1 in defense against intracellular bacterial infections Present Position: graduate student

Post-doctorate [n=3]

2016/10 - 2018/12 Principal Supervisor	Zhong Sun (In Progress) , Dalhousie University Thesis/Project Title: Systemic investigation of the role of RACK1 in unfolded protein response and induced systematic response Present Position: postdoctoral researcher
2016/10 - 2018/12 Academic Advisor	Jin Duan (Completed) , Dalhousie University Thesis/Project Title: characterization of antibiotic persistence mechanisms Present Position: postdoctoral fellow in the lab
2016/7 - 2020/12 Academic Advisor	Said Daboor (Completed) , Dalhousie University Thesis/Project Title: Characterization of novel strategies to disrupt *P. aeruginosa* biofilms Present Position: postdoctoral researcher

Research Associate [n=1]

2016/1 - 2022/12 Principal Supervisor	Renee Raudonis (Completed) , Dalhousie University Thesis/Project Title: Analysis of *Pseudomonas aeruginosa* transriptome at the single cell level Present Position: lab technician

International Collaboration Activities

2015/10 - 2021/12	collaborator, United States Collaborated with Dr. Shauna Somerville at Stanford University. Have NSF Arabidopsis 2010 joint grant and annual report meeting and discussion for grant proposal.
2015/10 - 2021/12	collaborator, United States Collaborated with Dr. Xinnian Dong at Duke University on a peroxidase project and publish a Phytochemistry paper together. Have NSF Arabidopsis 2010 joint grant and annual report meeting and discussion for grant proposal.
2015/10 - 2021/4	collaborator, United States Collaborated with Dr. Jen Sheen at Harvard Medical School and published a Nature paper together.
2014/9 - 2016/8	collaborator, China Collaborate on plant biotechnology to improve crop plant yield.
2015/1 - 2015/4	collaborator, Canada Collaborated with Dr. Brendan McConkey at the University of Waterloo and published a Nature paper together.
2013/4 - 2015/4	collaborator, Italy Collaborated with Dr. Giulia De Lorenzo at Università di Roma La Sapienza and published a PNAS paper together.

Other Memberships

2016/4	Member, Canadian Society of Microbiology
2016/3 - 2019/2	Associate Member, Beatrice Hunter Cancer Research Institute

Presentations

1. (2018). Silencing RACK1 inhibits Shigella flexneri motility within HeLa cells. 14th International Conference on Molecular Epidemiology and Evolutionary Genetics of Infectious Diseases, Sitges, Spain
   Main Audience: Researcher
   Invited?: No, Keynote?: No
2. (2017). RACK1-mediated immune signaling for detection of Pseudomonas aeruginosa-secreted protease. Department of Physiology and Biophysics seminar, Halifax, Canada
   Main Audience: Researcher
   Invited?: Yes, Keynote?: No
3. (2017). Characterization of the antipseudomonal effects of seaweed extracts. Canadian Society of Microbiology Annual meeting, Waterloo, Canada
   Main Audience: Researcher
   Invited?: No, Keynote?: No
4. (2017). Pseudomonas aeruginosa biofilm and antibiotic persistence. QEII Infectious Disease Group Research Round meeting, Canada
   Main Audience: Knowledge User
   Invited?: Yes, Keynote?: No
5. (2016). Implication of the studies of broad-host range pathogen, Pseudomonas aeruginosa. First International Young Scholars Forum of Tongji Hospital in Wuhan, China, Wuhan, China
   Main Audience: Knowledge User
   Invited?: Yes, Keynote?: No
6. (2016). Protease-Mediated Innate Immunity in Arabidopsis. University of Waterloo, Department of Biology seminar, Waterloo, Canada
   Main Audience: Researcher
   Invited?: Yes, Keynote?: No
7. (2016). Isolation of marine bacterial strains. Dalhousie University, Department of Biology Seminar, Halifax, Canada
   Main Audience: Researcher
   Invited?: Yes, Keynote?: No
8. (2015). Evolutionary Perspective of Host-Bacterial Interactions. Plant In New England, Boston, United States
   Main Audience: Researcher
   Invited?: Yes, Keynote?: No
9. Cheng Z. (2014). Characterization of a novel immune signaling pathway in Arabidopsis. Monthly Host Pathogen Hospital Meeting, Boston, United States
   Main Audience: Researcher
   Invited?: Yes, Keynote?: No

Broadcast Interviews

2016/05/09 - 2016/05/09	Cystic Fibrosis awareness month, TV News Program, CBC
2016/04/19 - 2016/04/19	Cystic Fibrosis award, News Video Network, AllNovaScotia

Text Interviews

2015/06/01	Publication of the novel plant innate immunity pathway, Interview by The Scientist magazine
2015/04/04	Publication of Nature paper, Faculty of Science, University of Waterloo, Press release

Publications

Journal Articles

1. Said Daboor, Renee Raudonis, Alejandro Cohen, John R. Rohde, and Zhenyu Cheng. (2019). Marine bacteria, a source for alginolytic enzyme to disrupt *Pseudomonas aeruginosa* biofilm. Marine Drugs. under revision: under revision.
   Revision Requested
   Refereed?: Yes, Open Access?: Yes
2. William Bain, Tolani Olonisakin, Minting Yu, Yanyan Qu, Mei Hulver, Zeyu Xiong, Huihua Li, Joseph Pilewski, Rama Mallampalli, S. Mehdi Nouraie, Anuradha Ray, Prabir Ray, Zhenyu Cheng, Rob Shanks, Warren Alexander, Claudette St. Croix, Roy Silverstein, and Janet S. Lee. (2019). Platelets inhibit apoptotic lung epithelial cell death and protect mice against infection-induced lung injury. Blood Advances. 3(3): 432-445.
   Published
   Refereed?: Yes, Open Access?: Yes
3. Chi Yan; Philippe Fullsack; Weei-Yuan Huang; Zhenyu Cheng; Jun Wang. (2019). IL-17RA deletion predicts high-grade colorectal cancer and poor clinic outcomes. International Journal of Cancer. in press: in press.
   In Press
   Refereed?: Yes
4. Jamie Cook, Gavin M. Douglas, Joseph P. M. Hui, Janie Zhang, Junzeng Zhang, Bernard R. Glick, Morgan G. I. Langille, Kun-Hsiang Liu, Zhenyu Cheng. (2019). Decreased levels of ethylene in *Brassica napus* increases plant fitness during an infection with *Pseudomonas aeruginosa*. Molecular Plant-Microbe Interactions. under review: under review.
   Submitted
   Refereed?: Yes
5. Janie Zhang, Jamie Cook, Jacob Nearing, Junzeng Zhang, Morgan Langille, Zhenyu Cheng. (2019). Plant growth promoting bacteria and microbiome: impact on crop health and yield. Microbiological Research. under review: under review.
   Submitted
   Refereed?: Yes
6. Eric S. Pringle, Craig McCormick, Zhenyu Cheng. (2019). Polysome profiling analysis of mRNAs and associated proteins engaged in translation. Current Protocols in Molecular Biology. 125(1): e79:1-13.
   Published
   Refereed?: Yes, Open Access?: No

7. Zheng Pang, Renee Raudonis, Bernard R. Glick, Tong-Jun Lin, Zhenyu Cheng. (2019). Antibiotic resistance in *Pseudomonas aeruginosa*: mechanisms and alternative therapeutic strategies. Biotechnology Advances. 37: 177-192.
Published
Refereed?: Yes, Open Access?: Yes

8. Zheng Pang, Robert D Junkins, Renee Raudonis, Adam J MacNeil, Craig McCormick, Zhenyu Cheng, Tong-jun Lin. (2018). Regulator of calcineurin 1 differentially regulates TLR-dependent MyD88 and TRIF signaling pathways. PLoS One. 13(5): 1-13.
Published
Refereed?: Yes, Open Access?: Yes

9. Yanyan Qu, Tolani Olonisakin, William Bain, Jill Zupetic, Hyunryul Ryu, Rebecca Brown, Mei Hulver, Zeyu Xiong, Robert M. Q. Shanks, Jennifer Bomberger, Vaughn Cooper, Jongyoon Han, Joseph Pilewski, Anuradha Ray, Zhenyu Cheng, Prabir Ray, Janet S. Lee. (2018). Thrombospondin-1 protects against pathogen-induced lung injury by limiting extracellular matrix proteolysis. Journal of Clinical Investigation Insight. 3(3): 1-16.
Published
Refereed?: Yes, Open Access?: Yes

10. Jamie Cook, Janie Zhang, Jeff Norrie, Zhenyu Cheng. (2018). Seaweed extract activates innate immune responses in *Arabidopsis thaliana* and protects host against bacterial pathogens. Marine Drugs. 16: 1-12.
Published
Refereed?: Yes

11. Emma Finlayson-Trick, Landon Getz, Patrick Slaine, Mackenzie Thornbury, Emily Lamoureux, Jamie Cook, Morgan Langille, Lois Murray, Craig McCormick, John Rohde, Zhenyu Cheng. (2017). Taxomomic differences of gut microbiomes drive cellulolytic enzymatic potential within hind-gut fermenting mammals. PLoS One. 12(12): 1-22.
Published
Refereed?: Yes, Open Access?: Yes

12. Zheng Pang, Robert Junkins, Adam MacNeil, Craig McCormick, Zhenyu Cheng, and Tong-Jun Lin. (2017). The calcineurin-NFAT axis contributes to host defense during *P. aeruginosa* lung infection. Journal of Leukocyte Biology. 102(6): 1461-1469.
Published
Refereed?: Yes

13. Cheng Z. (2016). A *Pseudomonas aeruginosa*-secreted protease modulates host intrinsic immune responses, but how?. BioEssays. 38: 1084–1092.
Published
Refereed?: Yes, Open Access?: No

14. Zhang X.-C., Millet Y., Cheng Z., Bush J., and Ausubel F.M. (2015). SGT1b/HSP70/HSP90 chaperone complexes play an essential role in jasmonate signaling in Arabidopsis. Nature Plants. 1: 1-8.
Published
Refereed?: Yes, Open Access?: Yes

15. Benedetti M., Pontiggia D., Raggi S., Cheng Z., Scaloni F., Ferrari S., Ausubel F.M., Cervone F., and De Lorenzo G. (2015). Plant immunity triggered by engineered release of oligogalacturonides, damage-associated molecular patterns. Proceedings of the National Academy of Sciences. 112: 5533–5538.
Published
Refereed?: Yes

16. Cheng Z., Li J.-F., Niu Y., Zhang X.-C., Woody O.Z., Xiong Y., Djonovic S., Millet Y., Bush J., McConkey B.J., Sheen J., and Ausubel F.M. (2015). Pathogen-secreted proteases activate a novel plant immune pathway. Nature. 521: 213-216.
Published
Refereed?: Yes

17. Mammarella N.D., Cheng Z., Fu Z.-Q., Daudi A., Bolwell G.P., Dong X., and Ausubel F.M. (2015). Apoplastic peroxidases are required for salicylic acid-mediated defense against *Pseudomonas syringae*. Phytochemistry. 112: 110-121.
    Published
    Refereed?: Yes, Open Access?: No
18. Li J., McConkey B.J., Cheng Z., Guo S., and Glick B.R. (2013). Identification of plant growth-promoting bacteria-responsive proteins in cucumber roots under hypoxic stress using a proteomic approach. Journal of Proteomics. 84: 119-131.
    Published
    Refereed?: Yes
19. Duan J., Jiang W., Cheng Z., Heikkila J.J., and Glick B.R. (2013). The complete genome sequence of the plant growth-promoting bacterium *Pseudomonas putida* UW4. PLoS One. 8(3): 1-12.
    Published
    Refereed?: Yes, Open Access?: Yes
20. Jiang W., Cheng Z., McConkey B.J., and Glick B.R. (2013). Investigating the role of protein UnkG from *Pseudomonas putida* UW4 in the ability of the bacterium to facilitate plant growth. Current Microbiology. 66(4): 331-336.
    Published
    Refereed?: Yes

Conference Publications

1. Cheng, Z., Li, J.-F., Bush, J., Sheen, J., and Ausubel, F. M. (2015). Characterization of Pseudomonas aeruginosa virulence factors. 68th Annual Meeting of the Massachusetts General Hospital Scientific Advisory Committee, Boston,
    Conference Date: 2015/4
    Poster
    Published
    Refereed?: No, Invited?: No