

Maxim Prokchorchik, PhD



Work address: 380 Werombi Rd, Brownlow Hill, 2570, NSW, Australia



Email: maxim.prokchorchik@sydney.edu.au



[LinkedIn](#)



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PROFILE

Independent Research Fellow conducting research in plant molecular biology focused on plant-microbial interactions of model and crop plants. I have a strong background in molecular biology, bioinformatics and synthetic biology. I conduct challenging and exciting research using a wide set of molecular biology, genetics, plant pathology, plant genomics and bioinformatic methods to dissect the details of the plant immune system and pathogen effector functions with the overarching goal of understanding and controlling the important pathogens of cruciferous crops.

WORK EXPERIENCE

October 2023 – present

Charles Gilbert Heydon Research Fellow • University of Sydney • Sydney, Australia

Research directions:

- Developing and conducting an independent research program on the soil-borne plant pathogens threatening the canola and vegetable industry in Australia.

October 2020 – September 2023

Postdoctoral Researcher • University of Bonn • Bonn, Germany

Research and teaching directions:

- Investigating the role of *Ustilago maydis* virulence factors during colonization of maize plants.
- Supervising graduate students and teaching the “Project Work in Plant Pathology” module.

February 2020 – September 2020

Research Assistant Professor • POSTECH Biotech Center • Pohang, Republic of Korea

May 2018 – January 2020

Postdoctoral Researcher • POSTECH Biotech Center • Pohang, Republic of Korea

Research directions:

- Molecular characterization of kiwifruit pathogen recognition in model plants.
- Whole genome assembly, annotation, and gene analysis *Phytophthora infestans* Korean isolates.
- Whole genome assembly, annotation, and resistance gene mapping in *Solanum americanum*.

EDUCATION

August 2014 – June 2018

Doctor of Philosophy (PhD) in Plant Science • Massey University • Palmerston North, New Zealand

PhD thesis title: Molecular analysis of plant innate immunity triggered by secreted effectors from bacteria and fungal pathogens of apple.

Research directions:

- Molecular characterization of blight-causing bacteria recognition by the genes from resistant wild apple plants.
- Genome assembly, virulence gene annotation in *Venturia nashicola*, fungal pathogen causing scab in Asian pear.

September 2009 – June 2014

Diploma of Specialist (BSc/MSc equivalent) in Molecular Biology

• **Belarusian State University • Minsk, Belarus**

Diploma thesis title: Analysis of plant-microbial interaction between phytopathogenic bacteria *Pectobacterium* and plants.

INTERNSHIPS

July 2013 – August 2013

**Undergraduate Summer Research Training Programme • John Innes Centre •
Norwich, UK**

PUBLICATIONS

Book chapters:

1. Djamei A, Depotter J, Saridis G, **Prokchorchik M**, Barghahn S, Teixeira N, Zuo W, Villamil JM, Doehlemann G. (2023) Modulation of Host Immunity and Development by *Ustilago maydis*. **Plant Relationships. The Mycota**, vol 5., doi: https://doi.org/10.1007/978-3-031-16503-0_1

Peer-reviewed research articles (* - equal contribution, § - co-corresponding authors):

1. Kim B, Yu W, Kim H, Dong Q, Choi S, **Prokchorchik M**, Macho A, Sohn KH, Segonzac C. (2023) A plasma membrane nucleotide-binding leucine-rich receptor mediates the recognition of the *Ralstonia pseudosolanacearum* effector RipY in *Nicotiana benthamiana*. **Plant Communications**, DOI: <https://doi.org/10.1016/j.xplc.2023.100640>
2. Lin X*, Jia Y*, Heal R, **Prokchorchik M**, Sindalovskaya M, Olave-Achury A, Makechemu M, Fairhead S, Noureen A, Heo J, Witek K, Smoker M, Taylor J, Shrestha R, Lee Y, Zhang C, Park SJ, Sohn KH§, Huang S§ and Jones, JDG§. (2023) *Solanum americanum* genome-assisted discovery of immune receptors that detect potato late blight effectors. **Nature Genetics**, DOI: <https://doi.org/10.1038/s41588-023-01486-9>
3. Ahn YJ*, Kim H*, Choi S*, Mazo-Molina C, **Prokchorchik M**, Zhang N, Kim B, Mang H, Koehler N, Kim J, Lee S, Yoon H, Choi D, Kim MS, Segonzac C, Martin G§, Schultink A§, Sohn KH§. (2023) Ptr1 and ZAR1 immune receptors confer overlapping and distinct bacterial pathogen effector specificities. **New Phytologist**, DOI: <https://doi.org/10.1111/nph.19073>
4. Kim H, **Prokchorchik M**, Sohn KH. (2022) Investigation of natural RIN4 variants reveals a motif crucial for function and provides an opportunity to broaden NLR regulation specificity. **Plant Journal**, DOI: <https://doi.org/10.1111/tpj.15653>
5. Choi S*, **Prokchorchik M***, Lee H, Gupta R, Lee Y, Chung EH, Cho B, Kim MS, Kim ST, Sohn KH. (2021) Direct acetylation of a conserved threonine of RIN4 by the bacterial effector HopZ5 or AvrBsT activates RPM1-dependent immunity in Arabidopsis. **Molecular Plant**, DOI: <https://doi.org/10.1016/j.molp.2021.07.017>

6. Pandey A, Moon H, Choi S, Yoon H, **Prokchorchik M**, Jayaraman J, Sujeevan R, Kang YM, McCann HC, Segonzac C, Kim CM, Park SJ, Sohn KH. (2021) *Ralstonia solanacearum* type III effector RipJ triggers bacterial wilt resistance in *Solanum pimpinellifolium*. **Molecular Plant-Microbe Interactions**, DOI: <https://doi.org/10.1094/MPMI-09-20-0256-R>
7. Moon H, Pandey A, Yoon H, Choi S, Jeon H, **Prokchorchik M**, Jung G, Witek K, Valls M, McCann HC, Kim MS, Jones JDG, Segonzac C, Sohn KH. (2021) Identification of RipAZ1 as an avirulence determinant of *Ralstonia solanacearum* in *Solanum americanum*. **Molecular Plant Pathology**, DOI: <https://doi.org/10.1111/mpp.13030>
8. Kim W, **Prokchorchik M**, Tian Y, Kim S, Jeon H, Segonzac C. (2020) Perception of unrelated microbe-associated molecular patterns triggers conserved yet variable physiological and transcriptional changes in *Brassica rapa* ssp. *pekinensis*. **Horticulture Research**, DOI: <https://doi.org/10.1038/s41438-020-00410-0>
9. **Prokchorchik M**, Pandey A, Moon H, Kim W, Jeon H, Jung G, Jayaraman J, Poole S, Segonzac C, Sohn KH, McCann HC. (2020) Host adaptation and microbial competition drive *Ralstonia solanacearum* phylotype I evolution in the Republic of Korea. **Microbial Genomics**, DOI: <https://doi.org/10.1099/mgen.0.000461>
10. Lee Y, Cho KS, Seo JH, Sohn KH, **Prokchorchik M**. (2020) Improved genome sequence and gene annotation resource for the potato late blight pathogen *Phytophthora infestans*. **Molecular Plant-Microbe Interactions**, DOI: <https://doi.org/10.1094/MPMI-02-20-0023-A>
11. **Prokchorchik M***, Won K*, Lee Y, Segonzac C, Sohn KH. (2020), Whole genome enabled phylogenetic and secretome analyses of two *Venturia nashicola* isolates. **The Plant Pathology Journal**, DOI: <https://doi.org/10.5423/PPJ.NT.10.2019.0258>
12. **Prokchorchik M**, Choi S, Chung EH, Won K, Dangl J, Sohn KH. (2020), A host target of a bacterial cysteine protease virulence effector plays a key role in convergent evolution of plant innate immune system receptors. **New Phytologist**, DOI: <https://doi.org/10.1111/nph.16218>
13. **Prokchorchik M**, Won K, Lee Y, Choi ED, Segonzac C, Sohn KH. (2019), High contiguity whole genome sequence and gene annotation resource for two *Venturia nashicola* isolates. **Molecular Plant-Microbe Interactions**, DOI: <https://doi.org/10.1094/MPMI-03-19-0072-A>
14. Gorshkov V, Gubaev R, Petrova O, Daminova A, Gogoleva N, Ageeva M, Parfirova O, **Prokchorchik M**, Nikolaichik Y, Gogolev Y. (2018), Transcriptome profiling helps to identify potential and true molecular switches of stealth to brute force behavior in *Pectobacterium atrosepticum* during systemic colonization of tobacco plants. **European Journal of Plant Pathology**, DOI: <https://doi.org/10.1007/s10658-018-1496-6>
15. Choi S, Jayaraman J, **Prokchorchik M**, Choi DS, Spiandore A, Rikkerink EH, Templeton MD, Segonzac C, Sohn KH. (2017), A bacterial acetyltransferase triggers immunity in *Arabidopsis thaliana* independent of hypersensitive response. **Scientific Reports**, DOI: <https://doi.org/10.1038/s41598-017-03704-x>

CONFERENCE PRESENTATIONS

2022 - Workshop on Biotrophy and Plant Immunity, Bonn, Germany. (Oral presentation)

2022 - VAAM Annual Conference (Association for General and Applied Microbiology), Dusseldorf, Germany. (Poster presentation)

2019 – IS-MPMI XVIII Congress, Glasgow, UK. (Invited flash talk)

2018 – POSTECH-National University of Singapore Plant Joint Symposium, Pohang, Republic of Korea. (Oral presentation)

2018 – Plant and Animal Genome Asia conference, Seoul, Republic of Korea. (Poster presentation)

2016 – POSTECH-Gyeongsang National University Plant Joint Symposium, Pohang, Republic of Korea. (Oral presentation)

2016 – IS-MPMI XVII Congress, Portland, Oregon, USA. (Poster)

2016 – International Conference on Arabidopsis Research (ICAR), Gyeongju, Republic of Korea. (Poster presentation)

SCHOLARSHIPS / AWARDS

2023-2026 – Charles Gilbert Heydon Travelling Research Fellowship at the University of Sydney (Sydney, Australia).

2014-2018 – Massey University and Plant and Food Research Joint Graduate School PhD Scholarship (Palmerston North, New Zealand).

2014 – "Future Biotech" Winter School Attendance fellowship (Moscow, Russia).

2013 – Undergraduate Summer Research Training Programme fellowship at John Innes Centre (Norwich, UK)