Dr. Philipp Bayer

Postdoctoral researcher

contact

philippbay@gmail.com github.com/philippbayer twitter.com/philippbayer

languages

German: mother tongue English: fluent French & Japanese: advanced

programming

Python Go, Perl, Bash, Java Ruby on Rails, JavaScript, HTML

research

Genomics of complex traits in domesticated plants

statistics

Citations: 1621 h-index: 17 i10-index: 19

education

2012–2015 **PhD** Applied Bioinformatics

University of Queensland, Brisbane

Working in the Applied Bioinformatics group on the use of genotyping by sequencing

to improve the genome assembly of canola.

Thesis submission date: 23rd September 2015. Date of acceptance: 4th May 2016.

2010–2012 **Master** of IT

Bond University, Gold Coast

Graduated with High Distinction

2006–2009 **Bachelor of Science** Biology

University of Münster, Germany

Thesis: Analysis of splicing in two populations of marine plants using bioinformatic

approaches

employment

2018-Current Forrest Fellow

UWA, Perth

Edwards Lab. Continued work on genomics of complex plants with Forrest Foundation support. Supervised one PhD student and two MSc students to completion.

2015–2017 **Postdoctoral researcher**

UWA. Perth

Edwards Lab. Researched genetics of complex plants with a focus on canola and wheat. Worked closely with industry partners to improve their breeding programs. Preparing, writing, and publishing research. Supervised two interns, Co-supervised four PhD students and one MSc student, system-administrator for the local computational infrastructure and group data manager. Worked extensively on an ARC Industrial Transfer and Industrial Control of the Industrial C

trial Transformation Training Centre application (2018 round).

publications

Scheben, A., Verpaalen, B., Lawley, C. T., Chan, C.-K. K., **Bayer, P. E.**, Batley, J., Edwards, D., "Crop-SNPdb: a database of SNP array data for Brassica crops and hexaploid bread wheat" The Plant Journal 98.1 (2019) pp. 142–152. Wiley Online Library

Anderson, R., Edwards, D., Batley, J., **Bayer, P. E.,** "Genome-Wide Association Studies in Plants" eLS (2019) pp. 1–7. Wiley Online Library

Mousavi-Derazmahalleh, M., **Bayer, P. E.**, Hane, J. K., Valliyodan, B., Nguyen, H. T., Nelson, M. N., Erskine, W., Varshney, R. K., Papa, R., Edwards, D., "Adapting legume crops to climate change using genomic approaches" Plant, cell & environment 42.1 (2019) pp. 6–19

Taylor, C. M., Kamphuis, L. G., Zhang, W., Garg, G., Berger, J. D., Mousavi-Derazmahalleh, M., **Bayer, P. E.**, Edwards, D., Singh, K. B., Cowling, W. A., "INDEL variation in the regulatory region of the major flowering time gene LanFTc1 is associated with vernalization response and flowering time in narrow-leafed lupin (Lupinus angustifolius L.)" Plant, cell & environment 42.1 (2019) pp. 174–187. Impact Factor: 6.173

Melonek, J., Zhou, R., **Bayer, P. E.**, Edwards, D., Stein, N., Small, I., "High intraspecific diversity of Restorer-of-fertility-like genes in barley" The Plant Journal 97.2 (2019) pp. 281–295. Wiley Online Library

Bayer, P. E., Golicz, A. A., Tirnaz, S., Chan, C.-K. K., Edwards, D., Batley, J., "Variation in abundance of predicted resistance genes in the Brassica oleracea pangenome" Plant biotechnology journal 17.4 (2019)

- **Bayer, P. E.,** Edwards, D., Batley, J., "Bias in resistance gene prediction due to repeat masking" Nature Plants 4.10 (2018) p. 762. Nature Publishing Group
- Mousavi-Derazmahalleh, M., Nevado, B., **Bayer, P. E.**, Filatov, D. A., Hane, J. K., Edwards, D., Erskine, W., Nelson, M. N., "The western Mediterranean region provided the founder population of domesticated narrow-leafed lupin" Theoretical and Applied Genetics 131.12 (2018) pp. 2543–2554. Springer
- The International Wheat Genome Sequencing Consortium (IWGSC), "Shifting the limits in wheat research and breeding using a fully annotated reference genome" Science 361.6403 (Aug. 2018) eaar7191
- Ramírez-González, R. H., Borrill, P., Lang, D., Harrington, S. A., Brinton, J., Venturini, L., Davey, M., Jacobs, J., Ex, F., Pasha, A., Khedikar, Y., Robinson, S. J., Cory, A. T., Florio, T., Concia, L., Juery, C., Schoonbeek, H., Steuernagel, B., Xiang, D., Ridout, C. J., Chalhoub, B., Mayer, K. F. X., Benhamed, M., Latrasse, D., Bendahmane, A., International Wheat Genome Sequencing Consortium, Wulff, B. B. H., Appels, R., Tiwari, V., Datla, R., Choulet, F., Pozniak, C. J., Provart, N. J., Sharpe, A. G., Paux, E., Spannagl, M., Bräutigam, A., Uauy, C., "The transcriptional landscape of polyploid wheat" Science 361.6403 (Aug. 2018) eagr6089
- Lee, H., Golicz, A. A., **Bayer, P. E.**, Severn-Ellis, A. A., Chan, C.-K. K., Batley, J., Kendrick, G. A., Edwards, D., "Genomic comparison of two independent seagrass lineages reveals habitat-driven convergent evolution" Journal of experimental botany 69.15 (2018) pp. 3689–3702. Oxford University Press UK. Impact factor: 5.830
- Mousavi-Derazmahalleh, M., **Bayer, P. E.**, Nevado, B., Hurgobin, B., Filatov, D., Kilian, A., Kamphuis, L. G., Singh, K. B., Berger, J. D., Hane, J. K., "Exploring the genetic and adaptive diversity of a pan-Mediterranean crop wild relative: narrow-leafed lupin" Theoretical and Applied Genetics 131.4 (2018) pp. 887–901. Springer
- Hurgobin, B., Golicz, A. A., **Bayer, P. E.**, Chan, C.-K. K., Tirnaz, S., Dolatabadian, A., Schiessl, S. V., Samans, B., Montenegro, J. D., Parkin, I. A., "Homoeologous exchange is a major cause of gene presence/absence variation in the amphidiploid Brassica napus" Plant Biotechnology Journal *16.7* (2018) pp. 1265–1274. Impact Factor: 6.09, JCR Plant Sciences 11/209 (Q1), Altmetric score: 6
- Schneider, M. V., Griffin, P. C., Tyagi, S., Flannery, M., Dayalan, S., Gladman, S., Watson-Haigh, N., **Bayer, P. E.**, Charleston, M., Cooke, I., "Establishing a distributed national research infrastructure providing bioinformatics support to life science researchers in Australia" Briefings in bioinformatics 20.2 (2017) pp. 384–389. Oxford University Press
- Kaur, P., Appels, R., **Bayer, P. E.**, Keeble-Gagnere, G., Wang, J., Hirakawa, H., Shirasawa, K., Vercoe, P., Stefanova, K., Durmic, Z., "Climate Clever Clovers: New Paradigm to Reduce the Environmental Footprint of Ruminants by Breeding Low Methanogenic Forages Utilizing Haplotype Variation" Frontiers in Plant Science 8 (2017) p. 1463. Frontiers Media SA
- Yuan, Y., **Bayer, P. E.**, Lee, H.-T., Edwards, D., "runBNG: a software package for BioNano genomic analysis on the command line" Bioinformatics 33.19 (2017) pp. 3107–3109. Oxford University Press. Impact factor: 7.3
- Yuan, Y., **Bayer, P. E.**, Scheben, A., Chan, C.-K. K., Edwards, D., "BioNanoAnalyst: a visualisation tool to assess genome assembly quality using BioNano data" BMC Bioinformatics 18.1 (2017) p. 323. BioMed Central. Impact factor: 2.4
- **Bayer, P. E.**, Hurgobin, B., Golicz, A. A., Chan, C.-K. K., Yuan, Y., Lee, H., Renton, M., Meng, J., Li, R., Long, Y., "Assembly and comparison of two closely related *Brassica napus* genomes" Plant Biotechnology Journal *15.12* (2017) pp. 1602–1610. Impact Factor: 6.09, JCR Plant Sciences 11/209 (Q1), Altmetric score: 11
- Yuan, Y., **Bayer, P. E.**, Batley, J., Edwards, D., "Improvements in Genomic Technologies: Application to Crop Genomics" Trends in Biotechnology *35.6 (2017) pp. 547–558*. Impact Factor: 12.06, JCR Biotechnology.

- ogy and Applied Microbiology 3/161 (Q1), Altmetric score: 7
- Montenegro, J. D., Golicz, A. A., **Bayer, P. E.**, Hurgobin, B., Lee, H., Chan, C.-K. K., Visendi, P., Lai, K., Dolezel, J., Batley, J., Edwards, D., "The pangenome of hexaploid bread wheat" The Plant Journal 90.5 (2017) pp. 1007–1013. Best paper award (Plant Journal) 2017 Resource Bronze, Impact Factor: 5.46, JCR Plant Sciences 13/209 (Q1), Altmetric score: 52
- Kaur, P., **Bayer, P. E.**, Milec, Z., Vrana, J., Yuan, Y., Appels, R., Edwards, D., Batley, J., Nichols, P., Erskine, W., Dolezel, J., "An advanced reference genome of *Trifolium subterraneum* L. reveals genes related to agronomic performance" Plant Biotechnology Journal *15.8* (2017) pp. 1034–1046. Wiley Online Library. Impact Factor: 6.09, JCR Plant Sciences 11/209 (Q1), Altmetric score: 15
- gacek2016genome Golicz, A. A., Bayer, P. E., Barker, G. C., Edger, P. P., Kim, H., Martinez, P. A., Chan, C. K. K., Severn-Ellis, A., McCombie, W. R., Parkin, I. A. P., Paterson, A. H., Pires, J. C., Sharpe, A. G., Tang, H., Teakle, G. R., Town, C. D., Batley, J., Edwards, D., "The pangenome of an agronomically important crop plant *Brassica oleracea*" Nature Communications 7 (2016) p. 13390. Nature Publishing Group. Citations: 5, Impact Factor: 11.32, JCR Multidisciplinary Sciences 3/63 (Q1), Altmetric score: 50
- Hane, J. K., Ming, Y., Kamphuis, L. G., Nelson, M. N., Garg, G., Atkins, C. A., **Bayer, P. E.**, Bravo, A., Bringans, S., Cannon, S., Edwards, D., Foley, R., Gao, L.-l., Harrison, M. J., Huang, W., Hurgobin, B., Li, S., Liu, C.-W., McGrath, A., Morahan, G., Murray, J., Weller, J., Jian, J., Singh, K. B., "A comprehensive draft genome sequence for lupin (*Lupinus angustifolius*), an emerging health food: insights into plant–microbe interactions and legume evolution" Plant Biotechnology Journal *15.3* (2017) pp. 318–330. Citations: 6, Impact Factor: 6.09, JCR Plant Sciences 11/209 (Q1), Altmetric score: 15
- Barash, M., **Bayer, P. E.**, Daal, A., "Candidate gene scan for Single Nucleotide Polymorphisms involved in the determination of normal variability in human craniofacial morphology" bioRxiv (2016) p. 060814. Cold Spring Harbor Labs Journals. Altmetric score: 9
- Lee, H., Golicz, A. A., **Bayer, P.**, Jiao, Y., Tang, H., Paterson, A. H., Sablok, G., Krishnaraj, R. R., Chan, C.-K. K., Batley, J., Kendrick, G. A., Larkum, A. W., Ralph, P. J., Edwards, D., "The genome of a southern hemisphere seagrass species *Zostera muelleri*" Plant Physiology *172.1* (2016) pp. 272–283. American Society of Plant Biologists. Citations; 3, Impact Factor: 6.28, JCR Plant Sciences 8/209 (Q1), Altmetric score: 6
- **Bayer, P. E.** "Genomics of Salinity". In: *Plant Genomics and Climate Change*. Ed. by David Edwards and Jacqueline Batley. Springer New York, 2016, 179–194
- Visendi, P., Berkman, P. J., Hayashi, S., Golicz, A. A., **Bayer, P. E.**, Ruperao, P., Hurgobin, B., Montenegro, J., Chan, C.-K. K., Staňková, H., "An efficient approach to BAC based assembly of complex genomes" Plant methods *12.1* (2016) p. 2. BioMed Central. Impact Factor: 3.4, JCR Plant Sciences 30/209 (Q1)
- Mason, A. S., Rousseau-Gueutin, M., Morice, J., **Bayer, P. E.**, Besharat, N., Cousin, A., Pradhan, A., Parkin, I. A. P., Chevre, A.-M., Batley, J., Nelson, M. N., "Centromere locations in *Brassica* A and C genomes revealed through half-tetrad analysis" Genetics 202.2 (2016) pp. 513–523. Genetics. Citations: 8, Impact Factor: 4.6, JCR Genetics & Heredity 29/166 (Q1)
- **Bayer, P. E.** "Skim-Based Genotyping by Sequencing Using a Double Haploid Population to Call SNPs, Infer Gene Conversions, and Improve Genome Assemblies". In: *Plant Bioinformatics: Methods and Protocols*. Ed. by David Edwards. Springer New York, 2016, pp. 285–292
- **Bayer, P. E.**, Ruperao, P., Mason, A. S., Stiller, J., Chan, C.-K. K., Hayashi, S., Long, Y., Meng, J., Sutton, T., Visendi, P., "High-resolution skim genotyping by sequencing reveals the distribution of crossovers and gene conversions in *Cicer arietinum* and *Brassica napus*" Theoretical and Applied Genetics *128.6* (2015) pp. 1039–1047. Springer Berlin Heidelberg. Citations: 14, Impact Factor: 3.9, JCR Agronomy 5/83 (Q1)
- Golicz, A. A., **Bayer, P. E.**, Edwards, D., "Skim-based genotyping by sequencing". In: *Plant Genotyping: Methods and Protocols*. Ed. by David Edwards. Citations: 6. Springer New York, 2015, pp. 257–

- Lai, K., Lorenc, M. T., Lee, H. C., Berkman, P. J., **Bayer, P. E.**, Visendi, P., Ruperao, P., Fitzgerald, T. L., Zander, M., Chan, C.-K. K., "Identification and characterization of more than 4 million intervarietal SNPs across the group 7 chromosomes of bread wheat" Plant Biotechnology Journal *13.1* (2015) pp. 97–104. Citations: 17, Impact Factor: 6.09, JCR Plant Sciences 11/209 (Q1)
- Chalhoub, B., Denoeud, F., Liu, S., Parkin, I. A. P., Tang, H., Wang, X., Chiquet, J., Belcram, H., Tong, C., Samans, B., Correa, M., Da Silva, C., Just, J., Falentin, C., Koh, C. S., Le Clainche, I., Bernard, M., Bento, P., Noel, B., Labadie, K., Alberti, A., Charles, M., Arnaud, D., Guo, H., Daviaud, C., Alamery, S., Jabbari, K., Zhao, M., Edger, P. P., Chelaifa, H., Tack, D., Lassalle, G., Mestiri, I., Schnel, N., Le Paslier, M.-C., Fan, G., Renault, V., **Bayer, P. E.**, Golicz, A. A., Manoli, S., Lee, T.-H., Thi, V. H. D., Chalabi, S., Hu, Q., Fan, C., Tollenaere, R., Lu, Y., Battail, C., Shen, J., Sidebottom, C. H. D., Canaguier, A., Chauveau, A., Berard, A., Deniot, G., Guan, M., Liu, Z., Sun, F., Lim, Y. P., Lyons, E., Town, C. D., Bancroft, I., Meng, J., Ma, J., Pires, J. C., King, G. J., Brunel, D., Delourme, R., Renard, M., Aury, J.-M., Adams, K. L., Batley, J., Snowdon, R. J., Tost, J., Edwards, D., Zhou, Y., Hua, W., Sharpe, A. G., Paterson, A. H., Guan, C., Wincker, P., "Early allopolyploid evolution in the post-Neolithic *Brassica napus* oilseed genome" Science 345.6199 (2014) pp. 950-953. American Association for the Advancement of Science. Citations: 384, Impact Factor: 34.6, JCR Multidisciplinary Sciences 2/62 (Q1), Altmetric score: 175
- Mason, A. S., Batley, J., **Bayer, P. E.**, Hayward, A., Cowling, W. A., Nelson, M. N., "High-resolution molecular karyotyping uncovers pairing between ancestrally related *Brassica* chromosomes" New Phytologist 202.3 (2014) pp. 964–974. Wiley Online Library. Citations: 16, Impact Factor: 7.21, JCR Plant Sciences 5/209 (Q1)
- Greshake, B., **Bayer, P. E.**, Rausch, H., Reda, J., "OpenSNP–a crowdsourced web resource for personal genomics" PLoS One 9.3 (2014) e89204. Public Library of Science. Citations: 26, Impact Factor: 3.057, JCR Multidisciplinary Sciences 11/63 (Q1), Altmetric score: 61
- Dattolo, E., Gu, J., **Bayer, P. E.**, Mazzuca, S., Serra, I. A., Spadafora, A., Bernardo, L., Natali, L., Cavallini, A., Procaccini, G., "Acclimation to different depths by the marine angiosperm *Posidonia oceanica*: transcriptomic and proteomic profiles" Frontiers in Plant Science *4 (2013) p. 195. Frontiers*

experience

2012-Current Research collaboration with Bayer CropScience, later BASF

Ghent, Belgium Continued collaboration with Bayer CropScience on their plant breeding projects

which includes several week-long visits to Bayer.

2011–Current **Co-founder openSNP.org**

Germany/Australia

A project for customers of genotyping companies like 23andMe to share their data with scientists around the world, for free. Partially wrote and still maintain the site's Ruby on Rails code-base, interact and manage with the community of 5000 users, administration of the site's servers, and supervision of contributors.

2013-Current Software Carpentry and Data Carpentry instructor

Certified Software Carpentry and Data Carpentry instructor. Software Carpentry is a Mozilla/Alfred P. Sloan Foundation funded non-profit organization which teaches best programming practices (structured programming, reproducible research, version control etc.) in bootcamps to scientists around the world. Data Carpentry is a sister-organisation that focuses on teaching best data management practices.

Research Bazaar Organising committee 2018

ResBaz is a world-wide three-day festival promoting digital literacy. As member of the organising committee I searched for helpers and teachers, drafted the timeplan, designed the web page, raised funding, succeeded in getting government MP to hold keynote

2017–Current Hacky Hour Founder

Founded the Hacky Hour at UWA, a weekly get-together of researchers and staff working with programming and data, doubles as a help-desk for students with programming problems.

2017-Current Mozilla Open Science Leadership mentor

UWA, Perth

Mentoring open source programmers and researchers on how to streamline and grow open source and open science projects under the umbrella of Mozilla.

2016-Current EMBL-ABR Head of Nodes member, Open Science Special Interest Group mem-

EMBL-ABR is an Australian-wide network supporting the technical needs of life sciences researchers. Members of the group of Head of Nodes meet monthly to discuss the way forward for the organisation. The Open Science Special Interest Group meets bimonthly to discuss how EMBL-ABR can advance open science in Australia.

2016-2017 **COMBINE WA Representative**

COMBINE is the student and early career researcher subcommittee of the Australian Bioinformatics and Computational Biology Society (ABACBS). As the local representative I organise or help organise workshops and regular networking events.

awards & funding

awards & tunding		
2019	Woodside Early Career Scientist of the Year, finalist Finalist in Premier's Science Awards 2019	
2018	Rising Stars nomination Two early career researchers per UWA research school were nominated for Rising Stars, a university-wide event where researchers introduce a public audience to their research	
2018	Forrest Research Foundation Non-stipendiary Fellowship Three year fellowship to pursue research at UWA, part of the three inaugural Forrest Fellows	
2017	UWA Research Collaboration Award \$28,100 to fund a seagrass microbiome sequencing project	
2014	GRDC Travel Award Travel cost scholarship	
2014	SAFS Travel Award Travel cost scholarship University of Queensland	
2013	Bayer Grants4Apps Grant to cover openSNP running costs Bayer HealthCare	
2011–2014	Two postgraduate scholarships University of Queensland My PhD was supported by two scholarships from UQ for tuition fees and living costs.	
2012	First place in PLOS/Mendeley Binary Challenge Won with openSNP.org Won first price in a competition aimed towards the advancement of open science	
2009-2011	Master IT 5x Top of class, 3x Vice-Chancellor's List for Academic Excellence, 1x IT Award Academic Excellence. Graduated with High Distinction. Recipient of John Oglethorpe Medal for highest GPA of all IT students graduating that semester	
teaching		
2019	Introduction to genomics on the command line Research Bazaar, Curtin University, Perth Introduction to the command line, bioinformatics analyses and pipelines, and basic SNP analysis in R	
2019	Introduction to tidyverse and caret in R UWA School of Human Sciences, Perth Introduction to R, tidyverse, ggplot2, caret, and basic statistics in R. Taught over two days.	
2018	Introduction to modern R Telethon Kids Institute, Perth Introduction to R, tidyverse, ggplot2, and basic statistics approaches in R. Taught over two days.	
2018	Teaching Data Carpentry Research Bazaar, University of Western Australia, Perth Introduction to genomics and shell. Part of the planning committee.	

Research Bazaar, Curtin University, Perth

UWA, Perth

Teaching Software Carpentry

data management practices

Introduction to data manipulation using Python

Hosted, planned, and set up the first Data Carpentry workshop at UWA, taught best

Teaching and hosting Data Carpentry

2017

2016

2016–Current	University teaching Co-teach and co-supervise SCIE4002, comp biomedical MSc students. Set up and mainta needed for practicals. In 2017, the course has over six semesters based on student evaluation	ain the computational infrastructure s been judged 'consistenly excellent'
2016	Teaching Software Carpentry Taught introduction to Python	Curtin University, Perth
2016	Teaching Software Carpentry Taught introduction to Python and git	Research Bazaar, Murdoch University, Perth
2016	Teaching and hosting Software Carpentry Hosted, planned, and set up the first Software introduction to programming.	
2014	Teaching Software Carpentry Taught basic to intermediate Python.	Sydney
2014	Teaching Software Carpentry Taught basic to intermediate Python.	PyCon AU/University of Queensland
2013	Teaching Software Carpentry Assisted Software Carpentry bootcamp in Adela	Adelaide aide
2009–2011	Tutoring Tutored students in Intro to Programming (Cle/MySQL) and Networks & Applications, held fore exams	

presentations

2019	Assembling complex plant genomes – things I wish someone would have told me earlier AGRF Seminar Series, Perth
2019	Helping Biologists Make Sense of Plant Variant and Annotation Data Plant And Animal Genome conference, San Diego
2018	Feeding the future world: safe-guarding Australia's food bowl in a changing climate Rising Stars, UWA
2018	From QTLs to candidate genes, or: There and Back Again Institute of Agriculture Seminar Series, UWA
2018	The path of least resistance (genes) - mining plant genomes for disease resistance COMBINE/Pawsey bioinformatics symposium
2018	Early Career Researcher Panel - What have I learnt at the beginning of my research career? Combined Biological Sciences Meeting 2018
2018	ScienceCafe - STEM outreach aimed at year 10 students UWA
2017	The future of wheat research Wheat showcase, UWA
2017	Skipping the assembly step – what we can learn from looking at sequences directly Pawsey Roadshow, UWA, Perth

2017	The State of Bioinformatics in High Performance Computing in 2017 HPCAC Conference, Perth
2017	Towards better plant breeding at UWA COMBINE event, Perth
2017	Improving Plant Breeding using KNetMiner Plant And Animal Genome conference, San Diego
2016	Towards a canola pan-genome: cautionary tales from the assembly bench CCDM, Curtin University
2016	Sharing Experience: What Can We Learn from Each Other Developing Plant Informatics Systems Plant And Animal Genome conference, San Diego
2015	Assessing and validating the amphidiploid genome of <i>Brassica napus</i> using genotyping by sequencing Plant And Animal Genome conference, San Diego
2015	Using skim-based genotyping by sequencing for trait association and QTL cloning in Brassica napus Plant And Animal Genome conference, San Diego
2014	Assembling and validating the genome of the <i>Brassica napus</i> using skimbased genotyping by sequencing University of Queensland, GenGen Seminar Series
2012	openSNP: Crowdsourcing Genome Wide Association Studies 28th Chaos Communication Congress, Berlin