## **Blake C. Meyers**

Donald Danforth Plant Science Center, Telephone: (314) 587-1422

 Member & Principal Investigator Email: bmeyers@danforthcenter.org

University of Missouri, Division of Plant Sciences, Citizenship: U.S. and U.K. (dual) Professor

#### Professional Preparation.

University of Chicago Biology B.A. (honors) 1992

University of California, Davis Genetics M.S. 1995

University of California, Davis Genetics Ph.D. 1998

DuPont Crop Genetics Plant Genomics Post-doc 1998 – 2000

University of California, Davis Genomics Post-doc 2000 – 2002

#### Appointments.

*2016 –* Member, The Donald Danforth Plant Science Center, St. Louis, MO

 Professor, University of Missouri, Division of Plant Science & Technology,

Columbia, MO

Adjunct Professor, Department of Biology, Washington University, St. Louis

*2010 – 2015* Edward F. & Elizabeth Goodman Rosenberg Professor

*2009 – 2015* Professor, Dept. of Plant and Soil Sciences, University of Delaware.

 Secondary Appointments:

Dept. of Computer and Information Sciences, College of Engineering (since 2006)

Dept. of Biological Sciences, College of Arts & Sciences (since 2014)

*2009 – 2015* Department Chair, Dept. of Plant and Soil Sciences, University of Delaware.

*2002 – 2006* Assistant Professor, *2006 – 2009* Associate Professor

Dept. of Plant and Soil Sciences, University of Delaware.

*2001 – 2002* Assistant Research Geneticist (adjunct faculty). University of California, Davis.

#### Awards and Honors

Elected Member, US National Academy of Sciences, 2022

Editor-in-Chief, The Plant Cell. 2020 – 2024.

Elected Fellow, American Society of Plant Biologists (ASPB), 2017

Charles Albert Shull Award, American Society of Plant Biologists (ASPB), 2017

ISI/Clarivate Highly Cited Researcher: 2014, 2015, 2016, 2018 (Top 1% most-cited)

Elected Fellow, American Association for the Advancement of Science (AAAS), 2012

Edward F. and Elizabeth Goodman Rosenberg Professor, 2010 – 2015

Elected member, North American ArabidopsisSteering Committee *(*NAASC), 2009 – 2013

President of NAASC, 2012 – 2013

National Science Foundation Pre-Doctoral Fellow, 1992 – 1995

Phi Beta Kappa honor society member since 1992

#### Selected significant publications. (\*indicates co-corresponding authors.)

Total refereed publications, 200+

[Google Scholar](https://scholar.google.com/citations?user=5hd_tmMAAAAJ): total citations, 35,800+; h-index, 89; i10-index, 209

ISI Researcher ID, B-6535-2012

ORCID: <http://orcid.org/0000-0003-3436-6097>

Karimi HZ, Baldrich P, Rutter BD, Borniego L, Zajt KK, **Meyers BC**, Innes RW. Arabidopsis apoplastic fluid contains sRNA- and circular RNA-protein complexes that are located outside extracellular vesicles. (2022) *Plant Cell.* 34:1863-1881. doi: 10.1093/plcell/koac043/6529400. *bioRxiv*. doi: 10.1101/2021.10.02.462881

Hacquard T, Clavel M, Baldrich P, Lechner E, Perez-Salamo I, Schepetilnikov M, Derrien B, Dubois M, Hammann P, Kuhn L, Brun D, Bouteiller N, Vaucheret H, **Meyers BC**, Genschik P. (2022) The Arabidopsis F-box protein FBW2 degrades AGO1 to avoid spurious loading of illegitimate small RNA. *Cell Reports.* 39:110671. doi: 10.1016/j.celrep.2022.110671. *bioRxiv* doi: 10.1101/2021.03.24.436811

Nan GL, Teng C, Fernandes J, O’Connor L, **Meyers BC,** Walbot V. A Cascade of bHLH-regulated pathways program maize anther development. (2022) *Plant Cell.* 34: 1207–1225. doi: 10.1093/plcell/koac007.

Pokhrel S, Huang K, **Meyers BC.** (2021)Conserved and non-conserved triggers of 24-nt reproductive phasiRNAs in eudicots. *Plant J.* 107: 1332-1345.doi: 10.1111/tpj.15382. *bioRxiv* doi: 10.1101/2021.01.20.427321

Pokhrel S, Huang K, Belanger S, Caplan JL, Kramer EM, **Meyers BC**. Pre-meiotic, 21-nucleotide reproductive phasiRNAs emerged in seed plants and diversified in flowering plants. *Nature Communications,* 12: 4941. doi: 10.1038/s41467-021-25128-y. *bioRxiv* doi:10.1101/2020.10.16.341925

Patel P, Mathioni SM, Hammond R, Harkess AE, Kakrana A, Arikit S, Dusia A, **Meyers BC** (2021) Reproductive phasiRNA loci and DICER-LIKE5, but not microRNA loci, diversified in monocotyledonous plants. *Plant Physiology*.185:1764-1782. doi: 10.1093/plphys/kiab001. *bioRxiv*, doi: 10.1101/2020.04.25.061721.

Veley K, Okwuonu I, Jensen G, Yoder M, Taylor N, **Meyers BC**, Bart R. Gene-tagging via CRISPR-mediated homology-directed repair in cassava. *G3*, 11:jkab028. doi: 10.1093/g3journal/jkab028. *bioRxiv,* doi: 10.1101/2020.05.14.090928

Lee YS, Maple R, Dürr J, Dawson A, Tamim S, del Genio C, Papareddy R, Luo A, Lamb JC, Sylvester AW, Birchler JA, **Meyers BC**, Nodine MD, Rouster J, Gutierrez-Marcos J. A retrotransposon surveillance mechanism that safeguards plant male fertility during heat stress. (2021) *Nature Plants.* 7, 34–41*.* doi: 10.1038/s41477-020-00818-5*.*

Bélanger S, Pokhrel S, Czymmek K, **Meyers BC.** (2020) Pre-meiotic, 24-nt reproductive phasiRNAs are abundant in anthers of wheat and barley but not rice and maize. *Plant Physiology.* 184:1407-1423. doi: 10.1104/pp.20.00816*. bioRxiv*, doi: 10.1101/2020.06.18.160440.

Huang K, Demirci F, **Meyers BC**, Caplan JL. (2020) Quantitative, super-resolution localization of small RNAs with sRNA-PAINT. *Nucleic Acids Research.* 48:e96*.* doi: 10.1093/nar/gkaa623. *bioRxiv* doi: 10.1101/716696v1.

Teng C\*, Zhang H\*, Hammond R, Kuang H, **Meyers BC**†**,**Walbot V†. (2020) *Dicer-like 5* deficiency confers temperature-sensitive male sterility in maize. *Nature Communications,* 11: 2912. doi: 10.1038/s41467-020-16634-6 *bioRxiv* doi: 10.1101/498410 \*equal contributions †co-corresponding authors

Nakano M, McCormick K, Demirci C, Demirci F, Gurazada SGR, Ramachandruni D, Dusia A, Rothhaupt JA, **Meyers BC**. (2020) Next-gen sequence databases: RNA and genomic informatics resources for plants. *Plant Physiology.* 182: 136-146*.*  doi: 10.1104/pp.19.00957

Ji L, Mathioni S, Johnson S, Tucker D, Bewick A, Kim K, Daron J, Slotkin RK, Jackson S, Parrott W, **Meyers BC**†, Schmitz R†. (2019) Genome-wide reinforcement of DNA methylation during somatic embryogenesis. *The Plant Cell.* 31: 2315-2331*.* doi: 10.1105/tpc.19.00255.†co-corresponding authors

Trolet A\*, Baldrich P\*, Criqui, M-C, Dubois M, Clavel M, **Meyers, BC,** Genschik P. (2019) Cell cycle-dependent regulation and function of ARGONAUTE1 in plants. *The Plant Cell.* 31: 1734-1750. doi: 10.1105/tpc.19.00069. \*equal contributions

Huang K, Baldrich P, **Meyers BC**†**,**Caplan J†. (2019) sRNA-FISH: versatile fluorescent *in situ* detection of small RNAs in plants. *The Plant Journal*, 98: 359-369. doi: 10.1111/tpj.14210 †co-corresponding authors

Baldrich P, Rutter RD, Zandkarimi H, Podicheti R, **Meyers BC**†, Innes RW†. (2019) Plant extracellular vesicles contain diverse small RNA species and are enriched in 10 to 17 nucleotide “tiny” RNAs. *The Plant Cell,* 31: 315-324. doi: 10.1105/tpc.18.00872*. bioRxiv* doi: 10.1101/472928 †co-corresponding authors

Xia R†, Chen C, Pokhrel S, Ma W, Huang K, Patel P, Wang F, Liu Z, Li J, **Meyers BC**†. (2019) 24-nt reproductive phasiRNAs are broadly present in angiosperms. *Nature Communications* 10: 627. doi: 10.1038/s41467-019-08543-0. †co-corresponding authors

Axtell MJ, **Meyers BC**. (2018) Revisiting criteria for plant miRNA annotation in the era of big data. *The* *Plant Cell,* 30:272-284*.* doi: 10.1105/tpc.17.00851  *bioRxiv,* DOI:10.1101/213314

Sidorenko LV\*†, Lee TF\*, Woosley A, Moskal WA, Bevan SA, Owens Merlo PA, Walsh TA, Wang X, Weaver S, Glancy T, Wang P, Yang X, Sriram S & **Meyers BC**†. (2017) GC-rich coding sequences reduce transposon-like, small RNA-mediated transgene silencing. *Nature Plants,* 3:875-884. DOI: 10.1038/s41477-017-0040-6 \*equal contributions †co-corresponding authors

Huang K, Doyle F, Wurz ZE, Tenenbaum SA, Hammond R, Caplan JL\* & **Meyers BC**\*. (2017) FASTmiR: An RNA-based sensor for *in vitro* andlive-cell detection of small RNAs. *Nucleic Acids Research*. 45: e130. DOI: 10.1093/nar/gkx504

Xia R, Xu J, **Meyers BC**. The emergence, evolution, and diversification of the miR390-TAS3-ARF pathway in land plants. (2017) *The Plant Cell.* 29:1232-1247. DOI: 10.1105/tpc.17.00185

Fan Y, Yang J, Mathioni S, Yu J, Yang X, Wang L, Zhang Q, Shen J, Cai Z, Xu C, Li X, Xiao J, **Meyers BC** & Zhang Q (2016). PMS1T, producing phased small interfering RNAs, regulates photoperiod-sensitive male sterility in rice. *Proc. Natl. Acad. Sci. USA (PNAS),* 113(52):15144-49.

Fei Q, Yang L, Liang W, Zhang D\* & **Meyers BC** (2016). Dynamic changes of small RNAs in rice spikelet development reveal specialized reproductive phasiRNA pathways. *J. Exp. Botany,* 67(21): 6037-6049*.* DOI: 10.1093/jxb/erw361

Char SN, Neelakandan A, Nahampun H, Frame B, Main M, Spalding M, Becraft P, **Meyers BC**, Walbot V, Wang K, & Yang B (2016). An Agrobacterium-delivered CRISPR/Cas9 system for high-frequency targeted mutagenesis in maize. *Plant Biotechnology Journal,* [epub]*.* DOI: 10.1111/pbi.12611

Zhang Y, Xia R, Kuang H, & **Meyers BC** (2016). The diversification of plant NBS-LRR defense genes directs the evolution of microRNAs that target them. *Mol Biol Evol,* 33: 2692-2705*.* DOI: 10.1093/molbev/msw154

Wendel JF, Jackson SA, **Meyers BC** & Wing RA (2016). Evolution of plant genome architecture. *Genome Biology.* 17:37. DOI: 10.1186/s13059-016-0908-1

Zhai, J., Bischof, S., Wang, H., Feng, S., Lee, T.-F., Teng, C., Chen, X., Park, S.Y., Liu, L., Gallego-Bartolome, J., Liu, W., Henderson, I.R., **Meyers, B.C.,** Ausin, I., and S.E. Jacobsen. (2015) A one precursor one siRNA model for Pol IV-dependent siRNA biogenesis. *Cell*.163:445-455. DOI: 10.1016/j.cell.2015.09.032.

Xia, R., Xu, J., and **B.C. Meyers.** (2015) Extensive families of miRNAs and *PHAS* loci in Norway spruce demonstratethe origins of complex phasiRNA networks in seed plants. *Molecular Biology and Evolution.* 32: 2905-2918. DOI: 10.1093/molbev/msv164

Fei, Q., Li, P., Teng, C., and **B.C. Meyers.** (2015) Secondary siRNAs from Medicago *NB-LRRs* modulated via miRNA-target interactions and their abundances. *The Plant Journal.* 83: 451-465. DOI: 10.1111/tpj.12900

Zhai, J., H. Zhang, S. Arikit, K. Huang, G.L. Nan, V. Walbot, and **B.C. Meyers**. (2015). Spatiotemporally dynamic, cell-type dependent premeiotic and meiotic phasiRNAs in maize anthers. *Proc. Natl. Acad. Sci. USA (PNAS)*. 112: 3146-3151. DOI: 10.1073/pnas.1418918112

Arikit, S., Xia, R., Kakrana, A., Huang, K., Zhai, J., Yan, Z., Valdés-López, O., Prince, S., Musket, T.A., Nguyen, H.T., Stacey, G., and **B.C. Meyers.** (2014) An atlas of soybean small RNAs demonstrates regulation by phased siRNAs of hundreds of coding genes. *Plant Cell.* 26: 4584-4601. DOI: 10.​1105/​tpc.​114.​131847

Wei, L., Gu, L., Song, X., Cui, X., Lu, Z., Zhou, M., Wang, L., Hu, F., Zhai, J., **Meyers, B.C.**, and X. Cao. (2014) Dicer-like 3 produces MITE-associated heterochromatic-siRNAs that control agricultural traits in rice. *Proc Natl Acad Sci USA.* 111: 3877-82.

Creasey, K.M., Zhai, J., Borges, F., Van Ex, F., **Meyers, B.C.**, and R.A. Martienssen. (2014) miRNAs trigger widespread epigenetically-activated siRNAs from transposons in Arabidopsis. *Nature.* 508: 411-415. DOI: 10.1038/nature13069.

Zhai, J., Zhao, Y., Simon, S.A., Huang, S., Petsch, K., Arikit, S., Pillay, M., Ji, L., Xie, M., Cao, X., Yu, B., Timmermans, M., Yang, B., Chen, X., and **B.C. Meyers**. (2013). Plant MicroRNAs display differential 3’- truncation and tailing, modifications which are ARGONAUTE1-dependent and conserved across species. *The Plant Cell.* 25: 2417-2428.

Stroud, H., Ding, B., Simon, S.A., Feng, S., Pellegrini, M., Wang, G.-L., **Meyers, B.C.**, and S.E. Jacobsen. (2013) Aberrant loss of DNA methylation in transgenic rice. *eLife*. 2: e00354.

Nobuta, K., Lu, C., Shrivastava, R., Pillay, M., De Paoli, E., Accerbi, M., Arteaga-Vasquez, M., Sidorenko, L., Jeong, D.-H., Yen, Y., Chandler, V. \*, Green, P.J., and **B.C. Meyers \***. (2008) A novel size distribution of endogeneous siRNAs in maize: evidence from deep sequencing in the *mop1-1* mutant. *Proc Natl Acad Sci USA.* 105:14958-63.

German, M.A., Pillay, M., Jeong, D.-H., Hetawal, A., Luo, S., Janardhanan, P., Kannan, V., Rymarquis, L., Nobuta, K., German, R., De Paoli, E., Lu, C., Schroth, G., **Meyers, B.C. \*,** and P.J. Green \*. (2008) Novel microRNA-target RNA pairs revealed by Parallel Analysis of RNA Ends (PARE). *Nature Biotechnology.* 26:941-946. \* co-corresponding authors.

Lu, C., Tej, S.S., Luo, S., Haudenschild, C.D., **Meyers, B.C.\***, and P.J. Green.\* (2005) Elucidation of the small RNA component of the transcriptome. *Science*. 309: 1576-1569.

*A full publication list is available on Google Scholar:*

<https://scholar.google.com/citations?user=5hd_tmMAAAAJ&hl=en>

#### Synergistic Activities.

1. Active leadership roles in the scientific community:
* North American Arabidopsis Steering Committee (NAASC), 2009-2013, including a term as president.
* Director since 2011, International Arabidopsis Informatics Consortium (IAIC). Supported by an NSF Research Coordination Network (RCN) award.
* Steering committee of “Epigenomics of Plants Consortium (EPIC)"
* Scientific Advisory Board, Institute of Plant and Microbial Biology--IPMB, Academia Sinica, Taipei, Taiwan (2015 – 2019)
* Organizer of numerous meetings, workshops, minisymposia, etc.
1. Editorial board member for four journals: *The Plant Cell* (since 2008; senior editor 2017-2020; Editor-in-Chief 2020-2024)*; Tropical Plant Biology; Rice, Current Opinion in Plant Biology.*
2. Consultant to numerous agricultural biotechnology companies.
3. Chair of my department for nearly seven years; a department with ~30 faculty, ~20 staff, 140 graduates and undergraduates, and a total portfolio of ~$28M in sponsored research. Hired six faculty in this time of which three have since been awarded NSF CAREER grants.

#### Invited seminars.

1. Seminars or presentations within the United States.
* Over 160 invited talks in the US since 1998.
1. International seminars or presentations*.*
* Over 100 invited talks at international meetings or institutions since 1998.

#### Teaching, mentoring, and advising (from 2002 to the present). (Univ. of Delaware; Univ. of Missouri; Danforth Center)

1. >20 postdoctoral scientists supervised.
2. >15 research associates or staff programmers supervised.
3. Graduate Student Major Advisor or Supervisor:
	1. Plant & Soil Sciences (UD), Div. of Plant Science & Tech. (MU), or Wash U: 10 Ph.D. students.
	2. Computer & Information Sciences, or Electrical & Computer Engineering (bioinformatics) at UD: 8 Ph.D. students, 27 M.S. students.
	3. Bioinformatics at UD: 4 Ph.D. students, 3 M.S. students.
	4. Visiting graduate students: 7 international Ph.D. students.
4. Awards received by lab members include NSF Postdoctoral Fellowships (2), IGERT scholarships (5), HHMI Hanna Gray Fellowship, University of Delaware Fellowships, Thousand Talents Program Finalist – award offered (China) (two lab members), a Life Sciences Research Foundation Post-Doctoral Fellowship, a Ford Foundation Diversity Postdoctoral Fellowship, ASPB Travel Awards, and other awards.
5. Alumni of my lab are employed in a wide variety of positions including faculty appointments, in industry (from plant biotech to computer science, and microchip fabrication to satellites), and in the government.