Blake Wiedenheft

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Education and Profession Experience:

2022-present **Professor Department of Microbiology and Cell Biology, Montana State University**
Research: Understanding the microbial immune response to viral infection and viral strategies for immune suppression.

2018-2022 **Associate Professor, Department of Microbiology and Immunology, Montana State University**
Research: Understanding the mechanisms of RNA-guided gene regulation in bacteria

2012-2018 **Assistant Professor, Department of Immunology and Infectious Disease, Montana State University**

2007-2012 **Postdoctoral Research Scientist, University of California at Berkeley**
Fellowship: Howard Hughes Medical Institute Fellow of the Life Sciences Research Foundation
Advisor: Prof. Jennifer A. Doudna
Project: Structure and function of nucleic acid based adaptive immune systems in bacteria

2002-2006 **PhD student, Montana State University**
Advisors: Profs. Mark Young and Trevor Douglas
Project: *Sulfolobus* as a model for the studying thermal virology and oxidative stress

Research Statement:

My career has been dedicated to understanding the mechanisms that viruses use to manipulate their hosts and the counter defense systems that microbes employ to defend themselves from infection. As a pre-doctoral fellow, my work involved cultivation, isolation, and molecular analysis of viruses that infect hyperthermophilic archaea. My efforts as a PhD student resulted in 15 publications and piqued my interest in the molecular arms race between viruses and their hosts. During my postdoctoral training, I set out to determine the molecular mechanisms of CRISPR RNA-guided adaptive immunity in *Pseudomonas aeruginosa*. As a postdoctoral fellow of the Life Sciences Research Foundation in Jennifer Doudna's lab at UC-Berkeley, I was awarded funding from the National Institutes of Health and the Howard Hughes Medical Institute. Data generated during this support resulted in two patents, eight manuscripts, and additional funding from National Science Foundation and the Bill & Melinda Gates Foundation. In 2012, I returned to MSU as an Assistant Professor to continue working on understanding the mechanisms of CRISPR-mediated immunity. Today, I lead an externally funded research team focused on understanding and engineering cellular machines for innovative applications in medicine and agriculture.

Awards & Honors

2024 Inducted into the Montana BioScience Alliance Hall of Fame
2022 Appointed to the affiliate faculty of the Cellular, Molecular, and Microbial Biology at the University of Montana
2022 Montana State University Alumni Foundation Award for Excellence
2020 Provost's Award for Undergraduate Research and Creativity Mentoring
2019 Charles and Nora Wiley Award for Meritorious Research and Creativity Mentoring
2019 Provost Distinguished Lecture
2018 MSU's home coming MVP ("Most Valuable Professor")
2017 Obama awarded Presidential Early Career Award for Scientists and Engineers (PECASE) (https://www.whitehouse.gov/the-press-office/2017/01/09/president-obama-honors-federally-funded-early-career-scientists), (https://loop.nigms.nih.gov/2017/01/qa-with-nigms-funded-pecase-winners/), (http://www.montana.edu/news/16660/msu-professor-wins-prestigious-presidential-award)
2017 "Vice President for Research's Meritorious Technology and Science Award", to recognize MSU faculty members who have made significant technological/scientific contributions which will likely be transferred to the private sector. (http://www.montana.edu/news/16638/msu-to-honor-top-faculty-and-staff)
2017 "Spirit of Discovery Award" for outstanding mentorship of students in the Honors College (http://www.montana.edu/news/16638/msu-to-honor-top-faculty-and-staff)
2016 Finalist for the Burroughs Wellcome Fund - Investigators in the Pathogenesis of Infectious Disease
2016 National Institutes of Health (NIH) Director's Early Career Scientist Award (http://www.montana.edu/news/16054/msu-s-blake-wiedenheft-invited-to-inaugurate-lecture-series-by-director-of-national-institute-of-general-medical-sciences)
2015 Amgen Young Investigator Award
2015 Student invited panelist for the Physical Virology Gordon Research Seminar (GRS).
2015 Winner of the student nominated Award for Excellence from the Montana State University Alumni Association and Bozeman Area Chamber of Commerce.
2014 New and Notable Lecturer, Biophysical Society
2013 Invited member of the Faculty of 1000
2013 Kopriva Lecturer
2013 Faculty Excellence Award
2013 Presidential Scholars Showcase Award
2013 Distinguished lecture, International Summer School, Tomsk State University, Russia
2008 Postdoctoral fellow of the Life Sciences Research Foundation - HHMI
2008 National Institutes of Health (NIH), Kirschstein NRSA fellowship – declined
2007 Laboratory Directed Research and Development (LDRD) award
2005 NSF Fellowship, Extremophiles - travel award

Publications (84 peer-reviewed papers; *~14,000 citations; h-index 47)*

1. Snyder LR, Kilde I, Nemudryi A, **Wiedenheft B**, Koutmos M, and Koutmou KS (**2024**) Adenosine modifications impede SARS-CoV-2 RNA-dependent RNA transcription. *RNA*, Published in Advance June 28, 2024, doi: 10.1261/rna.079991.124

2. Wood T.W.P., Henriques W.S., Cullen H.B., Romero M., Blengini C.S., Sarathy S., Sorkin J, Bekele H., Jin C., Kim S., Chemiakine A., Khondker R., Isola J.V.V., Stout M., Gennarino V.A., Mogessie B., Jain D., Schindler K., Suh Y., **Wiedenheft B,** Berchowitz L.E., **(2024)** Two retrotransposon-derived capsid genes PNMA1 and PNMA4 maintain reproductive capacity. doi: https://doi.org/10.1101/2024.05.11.592987

3. Burman N, Belukhina S, Depardieu F, Wilkinson RA, Skutel M, Santiago-Frangos A, Graham AB, Livenskyi A, Chechenina A, Morozova N, Zahl T, Henriques WS, Buyukyoruk M, Rouillon, C, Saudemont B, Shyrokova L, Kurata T, Hauryliuk V, Severinov K, Groseille J, Thierry A, Koszul R, Tesson F, Bernheim A, Bikard D*, **Wiedenheft B*,** Isaev A* **(2024)** Viral proteins activate PARIS-mediated tRNA degradation and viral tRNAs rescue infection. Accepted at *Nature*.

4. Nemudraia A, Nemudryi A, **Wiedenheft B (2024)** Repair of CRISPR-guided RNA breaks enables site-specific RNA editing in human cells. *Science* 25 Apr 2024, DOI: 10.1126/science.adk5518
Highlighted in *Nature Genetics* and Science

5. Henriques WS, Young JM, Nemudryi A, Nemudraia A, **Wiedenheft B***, Malik HS* **(2024)** The Diverse Evolutionary Histories of Domesticated Metaviral Capsid Genes in Mammals. *Molecular Biology and Evolution*, Volume 41, Issue 4, April 2024, msae061, https://doi.org/10.1093/molbev/msae061

6. Adler BA, Trinidad MI, Bellieny-Rabelo D, Zhang E, Karp HM, Skopintsev P, Thornton BW, Weissman RF, Yoon PH, Chen L, Hessler T, Eggers AR, Colognori D, Boger R, Doherty EE, Tsuchida CA, Tran RV, Hofman L, Shi H, Wasko KM, Zhou Z, Xia C, Al-Shimary MJ, Patel JR, Thomas V, Pattali R, Kan MJ, Vardapetyan A, Yang A, Lahiri A, Maxwell MF, Murdock AG, Ramit GC, Henderson HR, Calvert RW, Bamert RS, Knott GJ, Lapinaite A, Pausch P, Cofsky JC, Sontheimer EJ, **Wiedenheft B,** Fineran PC, Brouns SJJ, Sashital DG, Thomas BC, Brown CT, Goltsman DSA, Barrangou R, Siksnys V, Banfield JF, Savage DF, Doudna JA. **(2024)** CasPEDIA Database: a functional classification system for class 2 CRISPR-Cas enzymes. *Nucleic Acids Res.* 2024;52(D1):D590-D6. doi: 10.1093/nar/gkad890. PubMed PMID: 37889041; PMCID: PMC10767948.

7. Nemudryi A, Nemudraia A, Nichols JE, Scherffius AM, Zahl T, **Wiedenheft B (2023)** CRISPR-based engineering of RNA viruses. *Science Advances,* 13 Sep, Vol 9, Issue 37 DOI: 10.1126/sciadv.adj8277
News and Highlights in Inside Precision Medicine, Chemistry World, MSU News, TWiV 1045: Less Lassa starting at 33-min, and Tweeted by Nature Biotechnology, EmendoBio and Eli Lilly

8. Santiago-Frangos A, Henriques W, Wiegand T, Gauvin C, Buyukyoruk M, Neselu K, Eng E, Lander G, Wilkinson R, Graham A, **Wiedenheft B (2023)** Structure reveals why genome folding is necessary for site-specific integration of foreign DNA into CRISPR arrays. *Nature Structural & Molecular Biology,* 1-11 (https://doi.org/10.1038/s41594-023-01097-2)
Structure featured in the 2024 ASBMB calendar

9. Buyukyoruk M, Henriques WS, and **Wiedenheft B (2023)** Clarifying CRISPR: Why Repeats Identified in the Human Genome Should Not Be Considered CRISPRs, *The CRISPR Journal, Apr* https://doi.org/10.1089/crispr.2022.0106

10. Wiegand T, Wilkinson T, Santiago-Frangos A, Lynes M, Hatzenpichler R, **Wiedenheft B (2023)** Functional and Phylogenetic Diversity of Cas10 Proteins. *The CRISPR Journal, Mar https://doi.org/10.1089/crispr.2022.0085*

11. Mattos CD, Nemudryi AA, Faith D, Bublitz DC, Hammond L, Kinnersley MA, Schwartzkopf CM, Robinson AJ, Joyce A, Michaels LA, Brzozowski RS, Coluccio A, Xing DD, Uchiyama J, Jennings LK, Eswara P, **Wiedenheft B**, Secor PR **(2023)** *Polyamines and linear DNA mediate bacterial threat assessment of bacteriophage infection PNAS 120 (9) e2216430120 doi.org/10.1073/pnas.2216430120*

12. Goemann CLC, Wilkinson R, Henriques W, Bui H, Goemann HM, Carlsob RP, Viamajala S, Gerlach R, **Wiedenheft B (2023)** *Genome sequence, phylogenetic analysis, and structure-based annotation reveals metabolic potential of Chlorella sp. SLA-04. Algal Research Volume 69, January 2023, 102943, https://doi.org/10.1016/j.algal.2022.102943*

13. Nemudraia A, Nemudryi A, Buyukyoruk M, Scherffius AM, Zahl T, Wiegand T, Pandey S, Nichols JE, Hall L, McVey A, Lee HH, Wilkinson RA, Snyder LR, Jones JD, Koutmou KS, Santiago-Frangos A, **Wiedenheft B (2022)** Sequence-specific capture and concentration of viral RNA by type III CRISPR system enhances diagnostic. *Nature Communications 13 (1), 1-12, 10.1038/s41467-022-35445-5*

14. Nemudryi A, Nemudraia A, Wiegand T, Sternberg SH, **Wiedenheft B (2022)** A viral "codebreaker" intercepts a host alarm. *Host Cell & Microbe, Volume 30, Issue 12, 14 December 2022, Pages 1647-1648 10.1016/j.chom.2022.11.005*

15. Patterson A, White A, Waymire E, Fleck S, Golden S, Wilkinson R, **Wiedenheft B**, Bothner B. **(2022)** Anti-CRISPR proteins function through thermodynamic tuning and allosteric regulation of CRISPR RNA-guided surveillance complex *Nucleic Acids Res.* 2022 Oct 28;50(19):11243-11254. doi: 10.1093/nar/gkac841.

16. Wiegand TR, McVey A, Nemudraia A, Nemudryi A, Little A, Taylor DN, Walk ST, **Wiedenheft B (2022)** The rise and fall of SARS-CoV-2 variants and ongoing diversification of Omicron. *Viruses* 2022, 14(9), 2009; https://doi.org/10.3390/v14092009

17. Santiago-Frangos A, Nemudryi A, Nemudraia A, Wiegand T, Nichols JE, Krishna P, Scherffius AM, Zahl TR, Wilkinson RA, and **Wiedenheft B (2022)** CRISPR-Cas, Argonaute proteins and the emerging landscape of amplification-free diagnostics *Methods Volume 205,* https://doi.org/10.1016/j.ymeth.2022.06.002

18. Cherne M, Gentry A, Nemudraia A, Nemudryi A, Hedges J, Walk H, Blackwell K, Snyder DT, Jerome M, Madden W, Hashimi M, King DB, Plowright R, Jutila M, **Wiedenheft B**, Bimczok D

(2022) SARS-CoV-2 is detected in the gastrointestinal tract of asymptomatic endoscopy patients but is unlikely to pose a significant risk to healthcare personnel. *Gastro Hep Adv; 1(5): 844-852.* https://doi.org/10.1016/j.gastha.2022.06.002

19. Santiago-Frangos A, Buyukyoruk M, Wiegand T, Krishna P, **Wiedenheft B (2021)** Distribution and phasing of sequence motifs that facilitate CRISPR adaptation *Current Biology* 31, https://doi.org/10.1016/j.cub.2021.05.068

20. Nemudryi A, Nemudraia A, Wiegand T, Nichols J, Snyder DT, Hedges JF, Cicha C, Lee H, Vanderwood K, Bimczok D, Jutila MA, **Wiedenheft B (2021)** SARS-CoV-2 genomic surveillance identifies naturally occurring truncation of ORF7a that limits immune suppression. *Cell Reports* 35, https://doi.org/10.1016/j.celrep.2021.109197

21. Santiago-Frangos A, Hall LN, Nemudraia A, Nemudryi A, Krishna P, Wiegand T, Wilkinson RA, Snyder DT, Hedges JF, Jutila MA, Taylor MP, **Wiedenheft B (2021)** Intrinsic Signal Amplification by Type-III CRISPR-Cas Systems Provides a Sequence-Specific Viral Diagnostic. *Cell Reports Medicine*, Volume 2, Issue 6, 15 June,doi: https://doi.org/10.1016/ j.xcrm.2021.100319.

22. Daughenbaugh KF, Kahnonitch I, Carey CC, McMenamin AJ, Wiegand T, Erez T, Arkin N, Ross B, Wiedenheft B, Sadeh A, Chejanovsky N, Mandelik Y, Flenniken ML **(2021)** Metatranscriptome analysis of sympatric bee species identifies bee virus variants and a new virus, Andrena associated bee virus-1. *Viruses*

23. Wiegand T, Semenova E, Shiriaeva A, Fedorov I, Datsenko K, Severinov K, **Wiedenheft B (2020)** Reproducible Antigen Recognition by the Type I-F CRISPR-Cas System *The CRISPR Journal*, 3 (5), 378-387, *10.1089/crispr.2020.0069.*

24. Nemudryi A, Nemudraia A, Wiegand T, Surya K, Buyukyoruk M, Cicha V, Vanderwood K, Wilkinson R, **Wiedenheft B (2020)** Temporal detection and phylogenetic assessment of SARS-CoV-2 in municipal wastewater *Cell Reports Medicine*, 100098: http://doi.org/10.1016/j.xcrm.2020.100098

25. Wiegand T, Karambelkar S, Bondy-Denomy J, **Wiedenheft B (2020)** Structures and Strategies of Anti-CRISPR-Mediated Immune Suppression *Annual Review of Microbiology, 74 https://doi.org/10.1146/annurev-micro-020518-120107*

26. Cicha C, Hedges J, Novak I, Snyder D, Jutila M, **Wiedenheft B (2020)** Complete Genome Sequence of Brucella abortus Phage EF4, Determined Using Long-Read Sequencing *Microbiology Resource Announcements* 2020 9 (18): e00212-20. doi: 10.1128/MRA.00212-20

27. Hirschi M, Lu WT, Santiago-Frangos A, Wilkinson R, Golden SM, Davidson AR, Lander GC, **Wiedenheft B (2020)** AcrIF9 tethers non-sequence specific dsDNA to the CRISPR RNA-guided surveillance complex *Nature Communications* 11 (1), 1-6

28. Wiegand T, **Wiedenheft B (2020)** CRISPR Surveillance Turns Transposon Taxi. *The CRISPR Journal* 3 (1), 10-12, https://doi.org/10.1089/crispr.2020.29081.twi

29. Buyukyoruk M, **Wiedenheft B (2019)** Type I-F CRISPR-Cas provides protection from DNA, but not RNA phages. *Cell Discovery* 54, DOI: 10.1038/s41421-019-0123-9.

30. Rollins MF, Chowdhury S, Carter J*, Golden SM, Miettinen HM, Santiago-Frangos A, Faith D, Lawrence MC, Lander GC, **Wiedenheft B (2019)** Structure reveals mechanism of CRISPR RNA-guided nuclease recruitment and anti-CRISPR viral mimicry. *Molecular Cell* 74, 132–142, DOI: 10.1016/j.molcel.2019.02.001

31. Santiago-Frangos A, Wiegand T, **Wiedenheft B (2019)** Cas9 slide-and-seek for phage defense and genome engineering. *The EMBO Journal,* DOI: 10.15252/embj.2019101474

32. Wilkinson R, Martin C*, Nemudryi A, **Wiedenheft B (2018)** CRISPR RNA-guided autonomous delivery of Cas9. *Nature Structural & Molecular Biology, 26, 14–24,* DOI: 10.1038/s41594-018-0173-y

33. Bondy-Denomy J, Davidson DR, Doudna JA, Fineran PC, Maxwell KL, Moineau S, Peng X, Sontheimer EJ, and **Wiedenheft B (2018)** A Unified Resource for Tracking Anti-CRISPR Names. *The CRISPR Journal*, 1 (5), DOI: 10.1089/crispr.2018.0043

34. Fang F, Angulo B, Xia N, Sukhwani M, Wang Z, Carey CC, Mazurie A, Cui J, Wilkinson R, **Wiedenheft B**, Irie N, Surani MA, Orwig KE, Reijo PRA. **(2018)** PAX5-OCT4-PRDM1 developmental switch specifies human primordial germ cells. *Nature Cell Biology* 20 (6), 655. doi: 10.1038/s41556-018-0094-3.

35. Borges AL, Zhang JY, Rollins MCF, Osuna BA, **Wiedenheft B**, Bondy-Denomy J. **(2018)** Bacteriophage cooperation suppresses CRISPR-Cas3 and Cas9 immunity, *Cell,* 174, 917–925. doi: 10.1016/j.cell.2018.06.013

36. Sebrell TA, Sidar B, Bruns R, Wilkinson RA, **Wiedenheft B**, Taylor PJ, Perrino BA, Samuelson LC, Wilking NJ, Bimczok D. **(2018)** Live imaging analysis of human gastric epithelial spheroids reveals spontaneous rupture, rotation and fusion events. *Cell and Tissue Research*, Feb;371(2):293-307. doi: 10.1007/s00441-017-2726-5.

37. van Erp PBG, Patterson A, Kant R, Berry L, Golden SM, Forsman BL*, Carter J*, Jackson RN, Bothner B, **Wiedenheft B. (2018)** Conformational Dynamics of DNA Binding and Cas3 Recruitment by the CRISPR RNA-guide Cascade Complex. *ACS Chemical Biology,* Feb 16;13(2):481-490. doi: 10.1021/acschembio.7b00649.

38. Jackson RN, van Erp PBG, Sternberg SH, **Wiedenheft B. (2017)** Conformational regulation of CRISPR-associated nucleases. *Current Opinion in Microbiology*, 37:110–119. doi: 10.1016/j.mib.2017.05.010

39. Rollins MF, Chowdhury S, Carter J*, Golden S, Wilkinson R, Bondy-Denomy J, Lander GC, **Wiedenheft B. (2017)** Cas1 and the Csy complex are opposing regulators of Cas2/3 nuclease activity. *PNAS* Jun 27;114(26): E5113-E5121, DOI: 10.1073/pnas.1616395114 (http://www.montana.edu/news/16927/msu-scientists-publish-papers-in-two-scientific-journals-that-advance-understanding-of-how-bacteria-fight-viruses)

40. Chowdhury S, Carter J*, Rollins MF, Golden SM, Jackson RN, Hoffmann C*, Nosaka L, Bondy-Denomy J, Maxwell KL, Davidson AR, Fischer ER, Lander GC, **Wiedenheft B**, **(2017)** Structure Reveals Mechanisms of Viral Suppressors that Intercept a CRISPR RNA-Guided Surveillance Complex. *Cell* Mar 23;169(1):47-57. doi: 10.1016/j.cell.2017.03.012. (http://www.montana.edu/news/16927/msu-scientists-publish-papers-in-two-scientific-journals-that-advance-understanding-of-how-bacteria-fight-viruses) (https://www.scripps.edu/news/press/2017/20170328lander.html) (http://bpod.mrc.ac.uk/)

41. Bondy-Denomy, J and **Wiedenehft, B (2017)** CRISPR control of virulence in *Pseudomonas aeruginosa*. *Cell Research* 27:163–164. doi:10.1038/cr.2017.6

42. Carter J*, Hoffman C*, **B Wiedenheft (2017)** The Interfaces of Genetic Conflict Are Hot Spots for Innovation *Cell* 168 (1), 9-11. doi: 10.1016/j.cell.2016.12.007

43. Luo ML., Jackson RN, Denny SR, Tokmina-Lukaszewska M, Maksimchuk KR, Lin W, Bothner B, **Wiedenheft B**, and Beisel CL **(2016)** The CRISPR RNA-guided surveillance complex in Escherichia coli accommodates extended RNA spacers *Nucleic Acids Res,* Sep 6;44(15):7385-941.

44. Qazi S, Miettinen HM, Wilkinson RA, McCoy K, Douglas T, **Wiedenheft B (2016)** Programmed Self-Assembly of an Active P22-Cas9 Nano Carrier System. *Mol Pharm* 13 (3), 1191-1196

45. Hayes RP, Xiao Y, Ding F, van Erp PBG, Bailey S, **Wiedenheft B**, Ke A **(2016)** Structural basis for promiscuous PAM recognition in Type I-E Cascade from *E. coli Nature 530 (7591), 499-503*

46. Vorontsova D, Datsenko KD, Medvedeva S, Bondy-Denomy J, Savitskaya EE, Pougach K, Logacheva M, **Wiedenheft B**, Davidson A, Severinov K, and Semenova E. **(2015)** Foreign DNA acquisition by the I-F CRISPR–Cas system requires all components of the interference machinery. *Nucleic Acids Res* 43(22) 10848–10860.

47. Carter J*, **Wiedenheft B. (2015)** SnapShot: CRISPR-RNA-Guided Adaptive Immune Systems. *Cell* (163)1; 260.

48. Redding S, Sternberg SH, Marshall M, Gibb B, Bhat P, Guegler CK, **Wiedenheft B**, Doudna JA, Greene EC. **(2015)** Surveillance and processing of foreign DNA by the Escherichia coli CRISPR-Cas system *Cell* 163, 854–865

49. Bondy-Denomy J, Garcia B, Strum S, Du M, Rollins MF, Hidalgo-Reyes Y, **Wiedenheft B**, Maxwell KL, Davidson AR. **(2015)** Multiple mechanisms for CRISPR-Cas inhibition by anti-CRISPR proteins. *Nature 529,* 136-139

50. van Erp PB, Jackson RN, Carter J*, Golden SM, Bailey S, **Wiedenheft B. (2015)** Mechanism of CRISPR-RNA guided recognition of DNA targets in *Escherichia coli. Nucleic Acids Res* 30;43(17):8381-91 (Featured on the cover)

51. Jackson RN, McCoy AJ, Terwilliger TC, Read RJ, **Wiedenheft B**. **(2015)** X-ray structure determination using low-resolution electron microscopy maps for molecular replacement. *Nature Protocols,* 10(9):1275-1284 *(Featured on the cover)*

52. Jackson RN, and **Wiedenheft B. (2015)** A Conserved Structural Chassis for Mounting Versatile CRISPR RNA-Guided Immune Responses. *Mol Cell.* 28(58): 722–728

53. van Erp PB, Bloomer G, Wilkinson R., **Wiedenheft B. (2015)** The history and market impact of CRISPR RNA-guided nucleases. *Curr Opin Virol* 23(12): 85-90.

54. Rollins MF, Schuman JT, Paulus K, Bukhari HS, **Wiedenheft B. (2015)** Mechanism of foreign DNA recognition by a CRISPR RNA-guided surveillance complex from Pseudomonas aeruginosa. *Nucleic Acids Res* 43(4): 2216-2222

55. Jackson, RN, Golden S M, van Erp PB, Carter J, Westra ER, Brouns SJ, van der Oost J, Terwilliger TC, Read RJ, and **Wiedenheft, B. (2014)** Crystal structure of the CRISPR RNA-guided surveillance complex from *Escherichia coli*. *Science,* 345(6203):1473-1479. *(Featured on the cover, highlighted in a Science Perspective, on the NIH website, recognized by the Faculty of 1000, by the Stanford Synchrotron Radiation Lightsource, and featured as "molecule of the month" by the PDB.)*

56. van der Oost J, Westra ER, Staals R, Jackson R, **Wiedenheft B**. **(2014)** Unraveling the structural and mechanistic basis of CRISPR-Cas systems. *Nature Rev Micro*. 12(7): 479-92.

57. Wilkinson R, **Wiedenheft B**. **(2014)** A CRISPR method for genome engineering**.,** *F1000Prime Report*, 6:3

58. Jackson RN, Lavin M, Carter J, and **Wiedenheft B**, **(2013)** Fitting CRISPR-associated Cas3 in the Helicase Family Tree. *Curr Opin Struc Bio***.** 24: 106–114 *(Featured on the cover)*

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60. **Wiedenheft B. (2013)**. In Defense of Phage – Viral Suppressors of CRISPR-mediated Adaptive Immunity in Bacteria. *RNA Biology*, 10(5).

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65. **Wiedenheft, B.**, Lander, G.C., Zhou, K., Matthijs, J.M., Brouns, S.J.J., van der Oost, J., Doudna, J.A., Nogales, E. **(2011)**. Structures of the RNA-guided surveillance complex from a bacterial immune system. *Nature* 477(7365): 486-9.

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70. Maaty, W.S., **Wiedenheft, B.**, Heinemann, J., Tarlykov, P., Robison-Cox, J., Schaff1, N., Valenzuela, J., Dillman, A., Blum, P., Douglas, T*., et al.* **(2009)**. Something old, something new, something borrowed; how the thermoacidophilic archaeon Sulfolobus solfataricus responds to oxidative stress. *PLoS ONE* 4(9): e6964.

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Bioprospecting in high temperature environments; application of thermostable protein cages. *Soft Matter* *3*, 1091-1098.

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78. Young, M., **Wiedenheft, B.**, Snyder, J., Spuhler, J., Roberto, F., and Douglas, T. **(2005)**. Geothermal Biology and Geochemsitry in Yellowstone National Park. *Montana State University Extension Press*.

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81. Kraft, P., Oeckinghaus, A., Kummel, D., Gauss, G.H., Gilmore, J., **Wiedenheft, B.**, Young, M., and Lawrence, C.M. **(2004b)**. Crystal structure of F-93 from Sulfolobus spindle-shaped virus 1, a winged-helix DNA binding protein. *Journal of Virology* *78*, 11544-11550.

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Current and complete bibliography available at https://scholar.google.com/wiedenheft

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Invited Seminars (>100, *rescheduled due to COVID19)

07/25/2024 "*CRISPR-enable engineering of the human transcriptome.*" **Genentech, San Francisco, CA**

07/26/2024 "ATP-driven antigen sensors that trigger cellular arrest" **Doudna Lab 30-Year Anniversary Symposium, Berkeley, CA**

05/03/2024 "CRISPRs and anti-CRISPRs that kill the cell or arrest the ribosome" **Department of Biochemistry & Molecular Biology at University of Georgia, Athens, GA**

04/10/2024 "Mechanisms of CRISPR-mediated immunity and new strategies for RNA (not DNA) editing" **NIH/NIAID/RML, Hamilton, MT**

03/23/2024 "*CRISPR-based detection and editing of RNA*" **American Society of Biochemistry and Molecular Biology, San Antonio, TX**

03/08/2023 "Mechanisms of CRISPR-mediated immunity and applications beyond editing" **University of California at Berkeley, Berkeley CA**

03/07/2023 "Mechanisms of CRISPR-mediated immunity and applications beyond editing" **University of San Francisco California (UCSF), San Francisco, CA**

01/05/2023 "Mechanisms of CRISPR-mediated immunity and applications beyond editing" **NIH National Human Genome Research Institute, Bethesda, MD**

05/24/2022 "Mechanisms of CRISPR-mediated immunity and applications beyond editing" **FEBS: Machines on Genes, Alicante Spain**

03/23/2022 "Mechanisms of CRISPR-mediated immunity and applications beyond editing" **Structure Biology & Biochemistry, University of Colorado, Denver**

01/11/2022 "Mechanisms of CRISPR-mediated immunity and applications beyond editing" **Department of Chemistry at University of Michigan**

08/26/2021 "Mechanisms of CRISPR-mediated immunity and applications beyond editing" **Struther Arnott seminar series, St Andrews Scotland**

02/02/2021 "Temporal Detection and Phylogenetic Assessment of SARS-CoV-2 in Municipal Wastewater" **Tracing the Pandemic Through Wastewater: Using sewage monitoring to investigate infectious disease** Alaska Department of Environmental Conservation and the Centers for Disease Control and Prevention

06/1-10/2021 "Phase-dependent evolution of CRISPRs" **11th Annual CRISPR Conference (switched to video presentation due to ongoing SARS-CoV-2 pandemic)**

04/24-26/2021 "Phase-dependent evolution of CRISPRs" **2021 RNA Biology Symposium at the National Cancer Institute (NCI), Bethesda Washington DC**

02/18/2021 "Phase-dependent evolution of CRISPRs" **University of Nebraska Medical Center (switched to video presentation due to ongoing SARS-CoV-2 pandemic)**

02/2-3/2021 "Temporal detection and phylogenetic assessment of SARS-CoV-2 in municipal wastewater" **USARC/CDC's upcoming virtual conference: Wastewater-based Epidemiology**

09/12/2020 "Phase-dependent evolution of CRISPRs" **Plenary Lecture, IUM Daejeon Korea (switched to video presentation after SARS-CoV-2 outbreak)**

09/06/2020 "Navigating a Pandemic Through Innovation" Big Sky Business Insight Summit, **Statewide Virtual Platform**

*08/04/2020 "Phase-dependent evolution of CRISPRs" **University of Udine, Italy (cancelled after SARS-CoV-2 outbreak)**

08/19/2020 "Phase-dependent evolution of CRISPRs" **Cold Spring Harbor Labs, Cold Spring Harbor, NY (switched to video presentation after SARS-CoV-2 outbreak)**

06/23/2020 "Phase-dependent evolution of CRISPRs" **Berlin Seminar Series for Microbial Sciences (BSSMS), Germany (via ZOOM)**

*06/02/2020 "Phase-dependent evolution of CRISPRs" **2020 CRISPR Conference, Pasture Institute, Paris France (rescheduled for 2021)**

*03/16/2020 "Mechanisms of CRISPR RNA-guided defense and viral counter defense" Understanding Biology Through Structure, **New Mexico Consortium, Santa Fe NM (cancelled after SARS-CoV-2 outbreak)**

01/08/2020 "The Most Abundant Pest You Never Knew" **Pest Management, Bozeman MT.**

12/06/2019 "Viruses, Bacteria and the Art of Genome Surgery", **Marquette University Milwaukee WI.**

07/05/2019 "Viruses, Bacteria and the Art of Genome Surgery" Keynote speaker for the Masters of Science in Science Education graduation dinner, **Bozeman MT**

05/16/2019 "The Art and Ethics of Genome Surgery: A Citizen's Guide to Understanding a Revolutionary New Technology" The Emerson Cultural Center, **Bozeman MT**

04/30/2019 "Evolutionary outcomes of CRISPR-anti-CRISPR conflict" **Integrated Genomic Institute, UC-Berkeley, Berkeley CA**

04/09/2019 "Viruses, Bacteria and the Art of Genome Surgery" **Provost Distinguished Lecture, Bozeman MT** (http://www.montana.edu/news/18562/wiedenheft-to-explain-crispr-gene-editing-at-april-9-provost-lecture)

04/07/2019 **Illumina CRISPR-Cas & Genome Editing Expert Panel, Chicago, IL**

03/07/2019 "Evolutionary outcomes of CRISPR-anti-CRISPR conflict" **RNA Salon, Columbia University, NY**

01/28/2019 "Evolutionary outcomes of CRISPR-anti-CRISPR conflict" **Future in Biotechnology, Saint Petersburg, Russia**

10/06/2018 "Evolutionary outcomes of CRISPR-anti-CRISPR conflict" **Helmholtz Institute for RNA-based Infection Research (HIRI) in Würzburg, Germany**

11/01/2018 "Evolutionary outcomes of CRISPR-anti-CRISPR conflict" **CSHL: Transposable elements, Cold Spring Harbor, NY**

10/06/2018 "DNA surgery for Curing Genetic Disease" **MSU Research Symposium, Bozeman MT**

10/3-5/2018 "DNA surgery for Curing Genetic Disease" **MSU Roadshow, MT high line**

09/20/2018 "DNA surgery for Curing Genetic Disease" **MSU 10x10, Bozeman, MT**

07/22/2018 "Evolutionary outcomes of CRISPR-anti-CRISPR conflict" **FASEB: Virus assembly, Steamboat, CO**

07/16/2018 "CRISPR RNA-guided immune response to viruses that infect bacteria" **Mount Holyoke, South Hadley, MA**

07/15/2018 "Viral DNA induced activation of the CRISPR RNA-guided nuclease" **Gordon Conference on Microbial Stress, South Hadley, MA**

06/25/2018 *A CRISPR immune response to viruses that infect bacteria*" **FASEB Genes and Machines, Snowmass, CO**

06/21/2018 "*A CRISPR immune response to viruses that infect bacteria*" **CRISPR 2018, Vilnius Lithuania**

06/18/2018 "*A CRISPR immune response to viruses that infect bacteria*" **Gordon Research Conference on Microbial Stress Response, South Hadley, MA**

04/17/2018 "*A CRISPR immune response to viruses that infect bacteria*" **Department of Biochemistry and Molecular Biology, Rutgers University, NJ**

04/03/2018 "*A CRISPR immune response to viruses that infect bacteria*" **Washington University School of Medicine, St. Louis, MO**

03/16/2018 "*A CRISPR immune response to viruses that infect bacteria*" **National Center for Genome Resources, Santa Fe, NM**

02/21/2018 "*Evolutionary Outcomes of CRISPR-anti-CRISPR Conflict*" **Amgen, San Francisco, CA**

02/17/2018 "*Evolutionary Outcomes of CRISPR-anti-CRISPR Conflict*" **Innovation Road Show in Celebration of MSU 125th Anniversary, MT**

02/05/2018 "A New Method of DNA Surgery Promises to Cure Genetic Disease", **WonderLust, Bozeman MT**

01/15/2018 "*CRISPR Systems: Where they came from how they work and how they will impact Ag*" **College of Agriculture Connects, Montana State University, MT**

10/22/2017 "*A CRISPR immune response to viruses that infect bacteria*" **Cell Symposia on CRISPR: From Biology to Technology and Novel Therapeutics, Sitges Spain**

10/17/2017 "*A CRISPR immune response to viruses that infect bacteria*" **Skolkovo Institute of Science and Technology, Moscow, Russia**

10/06/2017 "*A CRISPR immune response to viruses that infect bacteria*" **University of Delft, Netherlands**

09/08/2017 "*A CRISPR immune response to viruses that infect bacteria*" **American Society for Bone and Mineral Research (ASBMR), Denver, CO**

08/18/2017 "*A CRISPR immune response to viruses that infect bacteria*" **Re-writing Genomes: A New Era in Genome Engineering, Berkeley CA (https://innovativegenomics.org/news/fifth-rewriting-genomes-symposium/)**

07/21/2017 "*A CRISPR immune response to viruses that infect bacteria*" **Genome Engineering – The CRISPR/Cas Revolution meeting, Cold Spring Harbor Laboratory, NY**

06/15/2017 "*A CRISPR immune response to viruses that infect bacteria*" **Oklahoma University, Norman OK**

05/29/2017 "*Evolutionary Outcomes of CRISPR-anti-CRISPR Conflict*" **Horizon Discovery, Vienna Austria**

05/24/2017 "*Evolutionary Outcomes of CRISPR-anti-CRISPR Conflict*" **12th Microsymposium on Small RNAs, Vienna Austria**

04/19/2017 "*DNA Surgery for Curing Genetic Diseases*" **Gallatin Valley Friends of the Sciences, Museum of the Rockies, Bozeman MT**

04/13/2017 "*A CRISPR immune response to viruses that infect bacteria*" **Portland State University, Portland OR**

04/03/2017 "*A CRISPR immune response to viruses that infect bacteria*" **Caribou Biosciences, Berkeley CA**

04/02/2017 "*A CRISPR immune response to viruses that infect bacteria*" **American Chemical Society, Goodman Symposium in honor of Jennifer Doudna, San Francisco CA**

03/22/2017 *"Bacterial CRISPR immune systems and viral subversion systems*" **Center for Biofilm Engineering, Montana State University, Bozeman MT**

03/16/2017 "*Bacteria, their Viruses, and How They Taught us to Perform Genome Surgery*" **Flathead Community College, Kalispell MT**

03/02/2017 "*A CRISPR immune response to viruses that infect bacteria*" **The Scripps Research Institute (TSRI), Jupiter FL**

01/27/2017 "*A CRISPR immune response to viruses that infect bacteria*" **Duke University, Durham NC**

12/04/2016 *"Molecular scalpels that protect Bacteria from viral infection are repurposed for surgical repair of genetic diseases"* **Session Speaker at the National Academy of Sciences' fifteenth Japanese-American Kavli Frontiers of Science symposium. National Academy of Sciences Arnold and Mabel Beckman Center, Irvine CA**

09/01/2016 "*A CRISPR immune response to viruses that infect bacteria*" **University of Washington, Seattle WA**

09/01/2016 *"The Big Impact of Small Machines"* **Freshman Research Symposium, Bozeman MT**

09/01/2016 "*A CRISPR immune response to viruses that infect bacteria*" **University of Illinois at Urbana-Champaign IL**

08/10/2016 "*Molecular vaccines that protect Bacteria from viral infection"* **NIH-NIAID-Rocky Mountain National Lab, Hamilton MT**

06/19/2016 "*A CRISPR immune response to viruses that infect bacteria*" **American Society of Virology, Virginia Tech, Blacksburg VA**

05/24/2016 "*The best offense is a good defense: understanding genetic conflict at near-atomic resolution*" **CRISPR Conference 2016, The Weizmann institute of Science, Rehovot, Israel**

04/22/2016 "*Molecular vaccines that protect Bacteria from viral infection*" **Hilleman Symposium, Montana State University Bozeman MT**

04/14/2016 "*A CRISPR immune response to viruses that infect bacteria*" **Lambda Lunch, National Institutes of Health, DC**

04/13/2016 "*Bacteria, Their Viruses, and How They Taught Us to Perform Genome Surgery"* ***NIGMS Director's Early Career Scientist Lecture*, National Institutes of Health, DC**

04/07/2016 "*A CRISPR immune response to viruses that infect bacteria*" **Molecular Machines Symposium, University of Georgia Athens, GA**

03/23/2016 "*CRISPR RNA-guide detection and destruction of invading DNA*" **University of Colorado, Denver CO**

01/27/2016 "*A CRISPR immune response to viruses that infect bacteria*" **University of Chicago, Chicago IL**

12/05/2015 "Structures of *RNA-guided search and destroy machines***" Regulating with RNA in Bacteria and Archaea. Cancun, Mexico.**

11/26/2015 "*A CRISPR immune response to viruses that infect bacteria*" **Cold Spring Harbor Asia conference on Development and Pathophysiology of the Respiratory System. Suzhou, China**

10/27/2015 "*A CRISPR immune response to viruses that infect bacteria*" **Ohio State University, Columbus OH**

10/14/2015 "*A CRISPR immune response to viruses that infect bacteria*" **Amgen Young Investigator Symposium, Broad Institute, Cambridge MA**

09/12/2015 "Structure and function of RNA-guided foreign DNA surveillance machines" **Keynote: Biomolecular Structure and Dynamics Symposium, Missoula MT**

06/19/2015 "The Dynamics of CRISPR RNA-guided Detection of Invading DNA" **Keynote: CRISPR conference, Rockefeller University NY**

06/09/2015 "*Structures Guided Insight into Mechanisms of RNA-guided Surveillance of Foreign DNA*" **The 19th Conversation, University of Albany NY**

05/17/2015 "*A CRISPR immune response to viruses that infect bacteria*" **Keynote: Virus Assembly, Dubrovnik, Croatia**

04/10/2015 "*A CRISPR immune response to viruses that infect bacteria*" **Dept. Microbiology, University of Wisconsin–Madison WI**

04/02/2015 "*Basic Research on Bacterial Immunity Forges Frontier in Genome Engineering"* **Rocky Mountain National Lab, Hamilton MT.**

03/26/2015 "*A CRISPR immune response to viruses that infect bacteria*" **Dept. Microbiology, University of Massachusetts Amherst MA**

03/19/2015 "*A CRISPR immune response to viruses that infect bacteria*" **Evnin Seminars in Chemical and Structural Biology, Rockefeller University NY**

02/09/2015 "*RNA-guided surveillance of invading DNA in Bacteria***" Dept. Molecular Structure & Function, Hospital for Sick Kids, Toronto Canada**

01/30/2015 "*A CRISPR immune response to viruses that infect bacteria***" Synthetic Genomics Institute, San Diego CA**

01/26/2015 "*RNA-guided surveillance of invading DNA in Bacteria***" Gordon Research Conference - Physical Virology, Ventura CA**

10/10/2014 "*X-ray structure of the CRISPR RNA-guided surveillance complex*" **Antiviral Defense Symposium, Wageningen University, Netherlands**

10/08/2014 **Keynote** "*A CRISPR immune response to viruses that infect bacteria*" **Dutch Molecular Genetics Society, Wageningen University, Netherlands**

09/24/2014 *RNA-guided surveillance of invading DNA in Bacteria***" Dept. of Pathology & Microbiology, University of Nebraska Medical Center, Omaha NE**

08/26/2014 "*A CRISPR immune response to viruses that infect bacteria*" **Dept. Biology and Biomedical Engineering, Georgia Tech GA**

05/14/2014 "*RNA-guided Cellular Surveillance***" Second annual European CRISPR conference. Berlin, Germany**

03/11/2014 **"***Mechanisms of adaptive immunity in bacteria"* **University of British Colombia, Vancouver, Canada**

03/27/2014 "*A CRISPR immune response to viruses that infect bacteria*" **Dept. of Biochemistry, University of Iowa IA**

02/20/2014 "*Understanding Mechanisms of RNA-guided Adaptive Immunity in Bacteria***" Departmental seminar Microbiology, University of Alabama at Birmingham**

02/16/2014 "*Structure of the CRISPR RNA-guided surveillance complex from the adaptive immune system in Escherichia coli"* **New and Notable lecture at the Biophysical Society Conference, San Francisco CA**

02/03/2014 "*CRISPR RNA-guided detection of invading DNA"* **Dept. of Cellular, Molecular, and Microbial Biology, Missoula, MT**

01/24/2013 "*CRISPR RNA-guided Machines that Respond to Viral Infections in Bacteria*" **Departmental seminar Chemistry and Biochemistry, Montana State University, Bozeman MT**

11/12/2013 "*A CRISPR immune response to viruses that infect bacteria*" **Kopriva lecture, Montana State University, Bozeman MT**

10/07/2013 "*RNA-guided Adaptive Immunity in Bacteria*" **Awarded Best Talk of Session, Third Biennial Western Regional IDeA Conference, Honolulu HI**

09/24/2013 "*RNA-guided Adaptive Immunity in Bacteria*" **Departmental seminar Microbiology, University of Alabama at Birmingham AB**

07/04/2013 "*A CRISPR Molecular Record for Documenting Dynamic Environmental Change."* **Earth and Environmental Science School, Tomsk State University, Russia**

06/17/2013 "*Finding Your Foe: RNA-guided Cellular Surveillance*" **Biochemical Society Focused Meeting CRISPR: evolution, mechanisms and infection. St Andrews University, United Kingdom**

06/11/2013 "*Finding Your Foe: RNA-guided Cellular Surveillance*" **2nd KIAS Conference on Subcellular Dynamics. Seoul, Korea**

04/25/2013 "*RNA-guided Adaptive Immunity in Bacteria*" **New England Biolabs, Boston, MA**

06/11/2013 "*CRISPR-control of gene expression*" **TechLInk Center, A DoD initiative to advance new technologies, Bozeman MT**

02/08/2013 "*RNA-guided Surveillance Systems Required for Adaptive Immunity in Bacteria*" **Department of Biochemistry, Gonzaga University, Spokane WA**

11/07/2012 "*RNA-guided Surveillance Systems Required for Adaptive Immunity in Bacteria*" **CNRS - Jacques Monod Conference, RNA: a key to coordination of gene expression. Roscoff, France**

10/31/2012 "*RNA-guided Surveillance Systems Required for Adaptive Immunity in Bacteria*" **AMI Group Scripps Research Institute, San Diego CA**

10/05/2012 "*RNA-guided Adaptive Immune System in Bacteria*" **Department of Microbiology, Bozeman MT**

07/23/2012 "*RNA-guided Adaptive Immune System in Bacteria*" **Northwest Crystallography Conference, Bozeman MT**

09/11/2011 "*RNA-guided Adaptive Immune System in Bacteria*" **Department of Immunology and Infectious Diseases, Montana State University, Bozeman MT**

08/23/2011 "*RNA-guided Adaptive Immune System in Bacteria*" **Gordon Conference on Nucleic Acids Research, Biddeford ME**

06/27/2010 "*RNA-guided Adaptive Immune System in Bacteria*" **FASEB on Virus Structure & Assembly, Saxton River VT**

Service

Public Service and Community Outreach:

- Addgene has distributed 57 of our plasmids to the research community
- Committee member for the 2022 Wilson- Stibitz Prize for the American Computer Museum
- Total requests for Wiedenheft lab plasmids made available to the public = 55
- Panel Discussion for alumni foundation on MSU's Research Response to COVID-19
- Facilitate SARS-CoV-2 seminar series where graduate students present research to high school classrooms around the state.
- Presentation on CRISPR to Helena High School (Feb 4th, 2021).
- Speaker at the Big Sky Business Insight Summit hosted by the Missoula Economic Partnership, Montana Bioscience Alliance, University of Montana, and Montana World

Trade Center (Oct 6-8,2020) to discuss opportunities for an emerging biotech sector in Montana.

- Fire side chat with Jennifer Dounda sponsored by the Rosalind Franklin Society, the CRISPR Journal and GEN (https://www.youtube.com/watch?v=Y8kTQM0IcpU).
- Research on CoV-2 covered in the Atlantic (https://www.theatlantic.com/health/archive/2020/09/tracking-coronavirus-through-sewage/615958/)
- Selection committee for the 2020 Stibitz|Wilson Awards (Craig Venter and Paula Apsell)
- Invited speaker and discussion leader for the Pest Management Meeting, Bozeman MT.
- Speaker to lead Café Scientifique hosted by MSU's Montana INBRE and COBRE programs, http://www.montana.edu/news/18539/msu-s-wiedenheft-to-discuss-genome-surgery-at-may-15-caf-scientifique
- Interviewed on "Under the Big Sky" radio program (KLTZ, The VOICE of northeast Montana) Glasgow Montana.
- Guest speaker (skype) 6th grade class on genetic engineering.
- Participation in MSUs 10x10 (http://www.montana.edu/news/17991/from-avalanches-to-westerns-msu-s-10x10-innovation-road-show-will-highlight-faculty-research)
- Participation in the MUS road show visiting 7 locations across the highline in 3 days (https://mus.edu/roadshow/)
- Participation in NSF Building Biology (http://www.montana.edu/news/17886/public-forum-exploring-the-science-and-ethics-of-gene-editing-set-for-aug-7)
- Interviewed on an episode of Montana Ag Live (PBS) that was later covered by the New York Times (https://www.nytimes.com/2018/09/17/opinion/bugs-weeds-gophers-a-trump-tv-antithesis-tackles-real-problems.html)
- Invited lecture "DNA Surgery for Curing Genetic Diseases" Anaconda Rotary Club, Anaconda MT (09/04/2018), Terry LaValley
- Created figures for a "graphic novel" entitled "Rock, Paper, Scissors - when microbes play games". The educational booked was supported by grants to Mariann Landsberger, a graduate student, who spearheaded the project.
- Featured in a promotional video for MSU health sciences https://www.youtube.com/watch?v=y3AGCKP9RNw&feature=youtu.be
- Invited lecture, "DNA Surgery for Curing Genetic Diseases" for the Gallatin Valley Friends of the Sciences, at the Museum of the Rockies, Bozeman MT (4/19/2017)
- Invited speaker for a community outreach project at the Flathead Community College. Lecture entitled "Bacteria, their Viruses, and How They Taught us to Perform Genome Surgery" (https://www.fvcc.edu/event/fvcc-honors-symposium-lecture-series-bacteria-viruses-taught-us-perform-genome-surgery/)
- NIH Director's Early Career Scientist Lecture –recognition of commitment to training and outreach – webcast (https://videocast.nih.gov/) to over 4,000 undergraduate students at campuses around the US. This lecture was featured on the NIH Biomedical Beats website (https://biobeat.nigms.nih.gov/2016/04/finding-adventure-blake-wiedenhefts-path-to-gene-editing/).
- Collaborated with the NIH on an IDeA video to promote research in underfunded states https://www.youtube.com/watch?v=WE9JFZGksm4

- Collaborated with an NIH-sponsored media company to create an educational profile about the people doing biomedical research (http://www.labtv.com/Home/Channels?instituteId=1803)
- Founder of the "Montana Wild Virus Hunt". This program engages Native American high school students and teachers in a hands-on virology workshop at Montana State University.
- Instructor for the Crow Education Partnership Program. This program provides science enrichment activities for ten, 4th grade classrooms and professional development for their teachers in three schools located on and adjacent to the Crow Reservation in Southwestern Montana. My students isolated and visualized viruses using electron microscopy.
- Mentor for MEPI (Middle Eastern Partnership Initiative), a U.S. Department of State-sponsored summer training program that facilitates a dialog focused on human rights.
- Educational interview on CRISPRs for Epigene (https://epigenie.wistia.com/medias/fyp44izz96)
- Interview and cited by the New York Times
- http://www.nytimes.com/2015/11/15/magazine/the-crispr-quandary.html?_r=0
- Interview and cited in NEW FOCUS published in *Science*
- http://www.sciencemag.org/content/341/6148/833.full

National and International Service:

Grant reviewer:

- 2022- NIH (National Center for CryoEM Access and Training) NCCAT - User Review Committee (URC)
- 2022 NIH study section, NIH ZRG1 F07A-B (20) L, Fellowship: Immunology and Infectious Disease
- 2022 *Ad-hoc* grant reviewer for NIAID AVIDD (RFA-AI-21-050) - Emergency Awards: Antiviral Drug Discovery (AViDD) Centers for Pathogens of Pandemic Concern
- 2021 *Ad-hoc* grant reviewer for NIH R35 study section (ZRG1 CB-J 55)
- 2020 Virtual Workshop Series for APLU CoR Fellows on Economic Development and Technology Transfer
- 2020 European Research Council (ERC) Advanced Grant
- 2020 Committee National Center for CryoEM Access and Training (NCCAT)
- 2020 External advisor BioCAT, Argonne National Laboratory - Sector 18/435B
- 2020/01 NIH Special Emphasis Panel ZRG1 IMST-H (15) B meeting
- 2019 Committee National Center for CryoEM Access and Training (NCCAT)
- The Leverhulme Trust (https://www.leverhulme.ac.uk/)
- Programme Strategic Scientific Alliances between China and the Netherlands (PSA)
- *Ad-hoc* grant reviewer: Wellcome Trust
- *Ad-hoc* grant reviewer: The Netherlands Organization for Scientific Research (NWO)
- *Ad-hoc* grant reviewer: European Research Council, 2013

External PhD examiner:

PhD examiner for Jooyoung Lee (University of Massachusetts, USA)

PhD examiner for Olga Musharova (Skoltech, Moscow, Russia)

PhD examiner for PhD defense of Sergey Shmakov (Skoltech, Moscow, Russia)
PhD examiner for Tim Kunne (Wageningen University, Netherlands)
PhD examiner for Luuk Loeff (Delft University, Netherlands)

Conference organizer:

Co-organizer FASEB "Genes on Machines" 2025
Co-organizer of the 2017 international CRISPR conference
NIH sponsored LabTv media highlighting research in the Wiedenheft Lab (2015).
(https://www.youtube.com/embed/ZW9EEGrBgYM?feature=plcp&rel=0&showinfo=0&autoplay=1)

Journal Referee and Editorial Activity:

Board of Editing Reviewers for *eLife*
Editorial board member of *The CRISPR Journal*
Strategic advisory board*, Faculty of 1000 Research*
Ad-hoc reviewer, *Rapid Reviews COVID-19*
Ad-hoc reviewer, *Communications Biology*
Ad-hoc reviewer, *Science*
Ad-hoc reviewer, *Nature*
Ad-hoc reviewer, *Nature Structural and Molecular Biology*
Ad-hoc reviewer, *Cell*
Ad-hoc reviewer, *Cell Reports*
Ad-hoc reviewer, *Cell Research*
Ad-hoc reviewer, *Nature Microbiology*
Ad-hoc reviewer, *Molecular Cell*
Ad-hoc reviewer, *EMBO Journal*
Ad-hoc reviewer, *Proceedings of the National Academy of Science*
Ad-hoc reviewer, *Nucleic Acids Research*
Ad-hoc reviewer, *Nature Communications*
Ad-hoc reviewer, *Nature Reviews Microbiology*
Ad-hoc reviewer, *Structure*
Ad-hoc reviewer, *Biochemical Journal*
Ad-hoc reviewer, *Journal of Molecular Biology*
Ad-hoc reviewer, *RNA Biology*
Ad-hoc reviewer, *PlosOne*
Ad-hoc reviewer, *FEBS Journal*
Ad-hoc reviewer*, Trends in Biochemical Sciences*
Ad-hoc reviewer, *Genes & Development*
Ad-hoc reviewer, *Genome Biology and Evolution*
Ad-hoc reviewer, *Current Opinions in Structural Biology*

University Service:

2024 Co-PI/PD on NIH COBRE submission
2022 Research Cyber Infrastructure (RCI) Advisory Council
2022 ITHS Steering Committee Member ($63M award)

2021 Selection committee for the Wiley Award
2021 Research Counsel
2021 Institutional Biosafety Committee (IBC)
2020 Institutional Biosafety Committee (IBC)
2020 MUS COVID task force
2020 Presidential Scholarship Committee
2019 Search Committee for new Cryo-EM position
2019 Presidents Planning Task Force – Research
2019 Search Committee for Dean of the Graduate School
2019 Search Committee for faculty in Microbiology and Immunology
2018 Search Committee for Dean of the Graduate School
2018 Search Committee for faculty in Microbiology and Immunology
2018 Committee for MSU Research Expansion Funds
2018 Presenter at the MSU 10x10 at the Ellen theater
2018 Presenter for the MSU Roadshow (bus tour across the Montana high line)
2018 Research Counsel
2018 Radiation Safety Committee
2018 Institutional Biosafety Committee (IBC)
2018 Equipment Fee Allocation Committee
2017 Search committee for new faculty in Plant Sciences
2017 Reviewer for the Charles and Nora Wiley Faculty Award for Meritorious Research
2017 Reviewer for the The Vice President for Research Meritorious Technology/Science Award
2017 Reviewer for the Spirit of Discovery Award
2017 Research Counsel
2017 Radiation Safety Committee
2017 Institutional Biosafety Committee (IBC)
2017 Table facilitator for the MSU diversity summit (phase II)
2017 Table facilitator for the MSU diversity summit (phase I)
2017 Faculty Search committee for Plant Sciences (Vice Martin)
2016 President appointed facilitator for the MSU Diversity and Inclusion Plan
2016 Presidential Scholarship Committee
2016 Co-organizer of the Maurice Hilleman Symposium on Vaccines
2016 Radiation Safety Committee
2016 Institutional Biosafety Committee (IBC)
2016 Equity Advocate
2016 Faculty Senate Representative
2016 Faculty Search committee for Microbiology and Immunology
2015 Participant in the Freshman Research Symposium (Organized by Ilse-Mari Lee)
2015 Radiation Safety Committee
2015 Institutional Biosafety Committee (IBC)
2014 *Ad-hoc* reviewer, for the Undergraduate Scholars Program (Director Colin Shaw)
2014 Participant in the Freshman Research Symposium (Organized by Ilse-Mari Lee)
2014 Institutional Biosafety Committee (IBC)
2014 Founder and organizer of the campus wide “Early Stage Investigators” program.
2014 Faculty Senate Representative for the Department of Microbiology and Immunology
2014 Search committee, VP and Dean for the College of Ag

2014 Search committee, Department Head for Microbiology and Immunology
2014 Chair of the Radiation Safety Committee
2014 Equipment Fee Allocation Committee (EFAC)
2014 MSU Advance Equity advocate (committee to advance diversity on campus)
2014 Arnold & Mabel Beckman Foundation Undergraduate Research Mentor
2013 *Ad-hoc* reviewer, for the Undergraduate Scholars Program (Director Colin Shaw)
2013 Participant in the Freshman Research Symposium (Organized by Ilse-Mari Lee)
2013 Institutional Biosafety Committee (IBC)
2013 Search committee, Assistant Professor in Immunology and Infectious Diseases
2013 Faculty Senate Representative
2013 Established campus wide monthly meeting for research active "Early Stage Investigators" at Montana State University.
2013 Founder of the "Montana Wild Virus Hunt." This program aims to engage high school students and teachers in a summer workshop at Montana State University. The workshop focuses on laboratory techniques in virology.
2013 Equipment Fee Allocation Committee (EFAC)
2012 Radiation Safety Committee
2012 Reviewer for the Undergraduate Scholars Program

Departmental Service

2021 Co-organizer of the Hilleman Symposium
2021 Search committee for faculty position in cryo-EM
2021 Chair search committee for cluster hire in Microbiology and Cell Biology
2019 Search committee for faculty position in cryo-EM
2019 Search Committee for faculty in Microbiology and Immunology
2017 Departmental Scholarship/Award Selection Committee
2016 Departmental Scholarship/Award Selection Committee
2016 Faculty Senate Representative
2016 Co-organizer of the Hilleman Symposium
2015 Faculty Senate Representative
2015 Selection Committee for Environmental Microbiology Faculty Search
2014 Scholarship/Faculty Award Committee
2014 Faculty Senate Representative for the Department of Microbiology and Immunology
2014 Co-organizer of the Microbiology and Immunology departmental seminar series
2014 Co-organizer of the Research in progress talk for the Dept. of Microbiology and Immunology
2013 Selection committee for the Pre-Veterinary & Veterinary Scholarships
2013 Co-organizer of the Dept. of Microbiology and Immunology graduate student Journal club
2013 Faculty Senate Representative for the Department of Microbiology and Immunology
2013 Co-organizer of the Microbiology and Immunology departmental seminar series
2013 Co-organizer of the Research in progress talk for the Dept. of Microbiology and Immunology
2013 Co-organizer of the Dept. of Microbiology and Immunology Journal club
2012 Faculty Senate Representative for the Department of Immunology and Infectious Diseases

Mentoring Experience

Current Postdoctoral Fellows:
Dr. Артем Немудрый (NIH K99 NIAID)
Dr. Anna Nemudraia

Postdoctoral Fellows Advised:
Dr. Andrew Santiago-Frangos (Life Sciences Research Foundation Fellowship, Burroughs Wellcome Fund)
Dr. Emma Kate Loveday (2018, Assistant Research Professor, Chemical & Biological Engineering)
Dr. Ryan Jackson (NRSA Postdoctoral fellow, 2016 Assistant Professor at Utah State University)

Current Ph.D. Students:
Nathaniel Burman (MCB, Anticipated graduation 2026)- NIH F31 NRSA scored in top 2%ile
Will Henriques (MCB, Anticipated graduation 2025)
Murat Buyukyoruk (MCB, Anticipated graduation 2022)
Trevor Zhal (MCB, Anticipated graduation 2026) – Sloan Scholar
Shishir Pandey (MCB, Anticipated graduation 2026)
Senuri de Silva (MCB, Anticipated graduation 2028)

Current Masters Students:
Agusta Little (MCB, Anticipated graduation 2024)

PhD Students Graduated:
Calvin Cicha (Microbiology and Immunology, Graduated 2023)- currently Assistant Professor at Carrol College
Tanner Wiegand (Microbiology and Cell Biology, Graduated 2021))- currently a postdoc at Columbia
Paul van Erp (Microbiology and Immunology, Graduated 2019))- currently Sequencing Application Specialist at PacBio

Masters Students Graduated:
Reece Erickson (Microbiology and Immunology, Graduated 2020) – currently a technician in the Walk lab
Enock Kessy (Microbiology and Immunology, Graduated 2019)- currently a PhD candidate at the Ifakara Health Institute.
Wayne Lin (Microbiology and Immunology, Graduated 2016)

Rotation Students Advised:
Alix Herr (Microbiology and Immunology, Fall 2012)
Tatsuya Akiyama (Molecular Biosciences Program, Fall 2012)
Laura Brutscher (Molecular Biosciences Program, Fall 2012)
Benjamin White (Molecular Biosciences Program, Spring 2013)
Jacob Munson-McGee (Molecular Biosciences Program, Spring 2013)
Delisha Meishery (Molecular Biosciences Program, Spring 2013)
Joanna Borgogna (Molecular Biosciences Program, Fall 2014)
Alexander McMenamin (Molecular Biosciences Program, Fall 2015)

Brittnay Jinkens (Molecular Biosciences Program, Fall 2015)
Eric Dunham (Microbiology and Immunology, Spring 2016)
Jennifer Dankoff (Microbiology and Immunology, Fall 2016)
Brian Ross (Molecular Biosciences Program, Fall 2016)
Maria Predtechenskaya (Microbiology and Cell Biology, Fall 2020)

Undergraduate Student Research Mentor:

1. Emelia Keim
2. Hanna Nyquist
3. Ava Graham (one publication, VPR undergraduate research scholarship and 2023 Barry M Goldwater scholarship)
4. Aidan McVey
5. Landon Shipley (NSF REU student)
6. Michael Angyus (two-time winner of MSU USP award)
7. Gabrielle Rizzo
8. Ian Novak
9. Jessica Corr
10. Pushya Krishna (2020 Barry M Goldwater scholarship, poster presentation at NCUR 2020, Presidential Scholar and VPR undergraduate research scholarship, one publication and two in preparation, 1 of 4 MSU students nominated for the 2020 Barry M Goldwater scholarship)
11. Laina Hall (2020 Barry M Goldwater scholarship, poster presentation at NCUR 2020, Presidential Scholar and VPR undergraduate research scholarship, 2023 NIH Postbac, 2023 accepted to PhD program at UC-Berkeley)
12. Cole Martin (Co-author of a paper published in *Nature Structure and Molecular Biology, 2020* accepted to PhD program in Chemical Engineering at University of Washington, 2022 NIH TL1 scholar in Translational science)
13. Dominick Faith (1 publication and The President's Emerging Scholars Award)
14. Myndi Holbrook (INBRE and USP research awards, paper in preparation)
15. Michael Angyus (poster presentation at NCUR 2020, INBRE and USP awards)
16. Robert Bruner (Irving Wiseman fellowship)
17. Memett Dursun
18. Matt Gotta
19. Allysa Jones
20. Samantha Goodbug
21. Kim Lantrip (NIH supported INBRE student from Flathead Community College that transferred to MSU after her summer research experience)
22. Kamrin Sorensen (HHMI supported undergraduate scholars program form Gonzaga University)
23. Britteny Forsman (1 publication, Honors College, NIH supported INBRE student, Carol Belohlavek & Nicholas Hether Microbiology Scholarship)
24. Kathryn McNamee (Honors College, HHMI supported undergraduate scholars program)
25. Connor Hoffmann (2 publication, Honors College, recipient of VPR undergraduate research scholarship, Truman Scholarship, http://www.montana.edu/news/17644/two-msu-students-receive-truman-scholarship)

26. Aspen Hirsch (HHMI supported undergraduate scholars program form Gonzaga University)
27. Josh Carter (9 publications, Honors College, HHMI supported undergraduate scholars program, Irving L. Weissman Undergraduate Biomedical Research Scholarship, Goldwater fellowship, finalist for the Truman fellowship, feature in a blog post by Dr. Francis Collins http://directorsblog.nih.gov/2016/03/17/labtv-curious-about-computer-modeling-of-proteins/, http://www.montana.edu/news/16088/national-institutes-of-health-director-features-msu-undergrad-on-blog), winner of the Rhodes (http://www.montana.edu/news/16538/msu-s-josh-carter-wins-rhodes-scholarship) and the Goldwater scholarships (http://www.montana.edu/news/16063/three-msu-students-receive-prestigious-goldwater-scholarships).
28. Kirra Paulus (1 publication, Honors College, Supported by the Undergraduate Scholars program, Outstanding Junior Award)
29. Jillian Stika
30. Michael Rutkowski
31. Janis Nicholes
32. Axl Levan

Technicians and Senior Research Scientists:
Andrew Scherffius (2021-present)
Aidan McVey (2021-present)
Helen Lee (2020-present) currently has one publication from the Wiedenheft lab
Dr. Royce Wilkinson (2013 – present) currently has six publications from the Wiedenheft lab
Will Henriques (2019) transition to grad student
Jennifer Wirth (2020-2021)
MaryClare Rollins (2012 – 2020) seven publications from the Wiedenheft lab, then transition to biotech
Sarah Golden (2012 – 2019) five publications from the Wiedenheft lab, transition to biotech
Dr. Heine Miettinen-Granger (2016– 2019) one publication then transition to another research lab

Summer Research Project Mentor for Tribal College Students:
Marcus Vandall (Ft. Peck Community College, 2013)
Floyd Mcmillan (Ft. Peck Community College, 2014)

Committee member for PhD students:
Jooyoung Lee (University of Massachusetts Medical School Graduate School of Biomedical Sciences, Worcester. Sontheimer Lab)
Olga Musharova (Skolkovo Institute of Science and Technology, Moscow, Russia)
Sergey Shmakov (Skolkovo Institute of Science and Technology, Moscow, Russia)
Jennifer Dankoff (Microbiology and Immunology)
Alix Herr (Microbiology and Immunology)
Luuk Loeff (Biophysics, Delft University, Netherlands)
Tim Kunne (Molecular Biology, Wageningen University, Netherlands)
Ethan Edwards (Biochemistry)
Ravi Chaudhary (Biochemistry)

Ece Topuzlu (Biochemistry)
Jonathan Martinson (Microbiology and Immunology)
Pilar Manriquein (Microbiology and Immunology)
Jacob Munson-McGee (Molecular Biosciences Program)
Laura Brutscher (Molecular Biosciences Program)
Benjamin Schwarz (Chemistry)
Greg Prussia (Biochemistry)
Paul Jordan (Chemistry)

Committee member for Masters students:
Dengfeng Li (Microbiology and Immunology)
Stephen Olshefsky (Microbiology and Immunology)

Professional Development
2021 406 Labs Spring

TEACHING

Instructor

Course Number	Course	Number of Students	Year
UCONJ599/MB594	Translational Science Seminar	18	2022-2023
BIOB435/BIOB530	Virology	75	2014-2023
BIOB415/MB525	Biotechnology	12	2013-2020
HONR291 011	Virology	18	2019
MBSP613	Scientific Writing	12	2014-2018
MB592	Journal Club (Speaker-Based)	22	2015-2017

Lecturer

Course Number	Course	Number of Students	Year
BIOB478	Functional Gene Expression	15	2013, 2017
BIOM400	Medical Microbiology	30	2013-2014
BIOM455	Molecular Methods	25	2014
BIOM410	Microbial Genetics	35	2014
MB525	Advanced Immunology	22	2014-2022
BCH544	Advanced Molecular Biology	25	2014
BIOB375	Genetics	20	2014-2019
BIOB105	Biotech	40	2012-2019
BIOB375	Genetics	20	2015
BIOB424/BIOB524	Bioethics	40	2013-2020
MB592	Journal Club-Speaker-Based	22	2015-2017
BIOB105	Biotech	60	2015-2020
EMEC424	Cellular Mechanotransduction	12	2016-2017
TE250	Technology and Society	50	2016
BCH441	Macromolecules	30	2017

PHL321	Philosophy & Biomedical Ethics	40	2017-2022
HONR494	Human Nature	30	2018
MB525	Advanced Immunology	14	2018
BIOB477	Genome Science & Gene Expression	30	2019
HSTR207	Science & Tech in World History	30	2017-2020
BIOM490R	Undergraduate Research	3-8	2017-2020
EBIO216	Principles of Bio Engineering	40	2017-2020
CSCI/EGEN/PHL/LSCI291	Technology, Ethics, and Society	30	2020

PRODUCTS

Patents: *Holder of six issued US patents, five US non-provisional applications pending, five international applications pending, and 3 US provisional applications pending.*

1. Title: NUCLEIC ACID DETECTION USING TYPE III CRISPR COMPLEX
   International Application No. PCT/US2022/074017
   US Patent 11,814,689 (Track 1 Appl. No. 17/814,097)
   US Continuation Appl. No. 18/331,811
   Claims priority to U.S. Provisional Application Nos. 63/224,356, 63/320,198 and 63/320,199

2. Title: CRISPR-BASED PROGRAMMABLE RNA EDITING
   U.S. Track One Application No. 17/811,391
   International Application No. PCT/US2022/073538
   Claims priority to U.S. Provisional Application No. 63/219,722

3. Title: PROGRAMMABLE DELIVERY OF RNA-GUIDED CRISPR-CAS EFFECTORS TO SUBCELLULAR ORGANELLES
   International Application No. PCT/US2023/065695
   US Track 1 Appl. No. 18/299,692
   Claims priority to U.S. Provisional Patent Appl. No. 63/329,952 and 63/450,339

4. Title: Endoribonuclease Compositions and Methods of Use Thereof
   Inventors: Haurwitz, R.E.; Doudna, J.A.; Wiedenheft, B.; Jinek, M.
   US Patent No. 9,115,348 (Appl. No. 13/671,120)
   US Divisional Patent No. 9,605,246 (Appl. No. 14/735,383)
   US Divisional Patent No. 9,708,646 (Appl. No. 15/430,054)
   Claims priority to International Application No.: PCT/US2011/035775, Provisional Patent Appl. Nos. 61/333,163, 61/265,627, 61/413,287
   Pub. No.: WO/2011/143124

5. Title: Methods of Generating Nucleic Acid Fragments
   Inventors: B. Wiedenheft, K. Zhou; Kaihong, J.A. Doudna
   United States Patent No. 10,087,431 (Appl. No. 13/039,160)
   Pub. No.: US 2011-0223638 A1
   Claims Priority to US Provisional Appl. No. 61/312,510
   US Continuation Patent No. 11,046,941 (Appl. No. 16/148,937)

Methods for Generating Nucleic Acid Molecule Fragments Having a Customized Size Distribution
Inventors: Keith L. Ligon, Justin Craig, Azra H. Ligon
US Appl. No. 14/776,126
Claims priority to International Application No.: PCT/US2014/024598 and US Provisional Appl. No. 61/788,006

Title: ENGINEERED CRISPER-CAS SYSTEMS AND METHODS FOR SENSITIVE AND SPECIFIC DIAGNOSTICS
US Non-Provisional Application No. 17/240,858
US Track 1 Appl. No. 17/814,674
European Patent Convention Appl. No. 21796099.6
Chinese Patent Appl. No. 202180044658
Claims priority to PCT/US2021/029219, US Provisionals 63/080,128; 63/065,626; 63/157,568; 63/065,094; 63/047,598; 63/046,936; 63/016,081

6. Title: RNA-GUIDED RNA EDITING
   US Provisional Appl. No. 63/523,592
   US Provisional Appl. No. 63/534,305
   US Provisional Appl. No. 63/536,376Titled: NUCLEIC ACID DETECTION USING TYPE III CRISPR COMPLEX
   International Application No. PCT/US2022/074017
   Based on U.S. Provisional Application Nos. 63/224,356, 63/320,198 and 63/320,199Filed: July 21, 2022
   PW Ref.: 065869-0570296

Current and Pending Support

Active:

National Institutes of Health
R35GM134867-01 (PI: **Wiedenheft**) 01/01/2020 – 12/30/2024
Total award: $3.3 M 7.0 calendar
Title: Structural and functional understanding of bacterial defense and viral counter defense
Title: A Multi-User Cryo-Electron Microscope for the Cellular and Molecular Life Sciences Community in the Northern Rocky Mountain Region

National Science Foundation
Accelerating Research Translation (ART) program.
(PI: Juliano, Project Leader: Wiedenheft)
Total Award: $6 M ($200K subaward to Wiedenheft)
Title: CRISPR-methods for RNA-editing
Goal: We are developing new technologies that enable precision modification of the human transcriptome without permanent changes to genome.
Project/Proposal Start and End Date: (MM/YYYY) (if available): 02/01/2024 - 01/30/2025

National Institutes of Health 03/21/2022 – 02/28/2027

NIH/NCATS TL1TR002318 (PI: Whitney, Site PI: Wiedenheft) 0.6 Cal Months
Total costs to MSU: $281,290
Goal: The goal of this program is to create a cross-disciplinary community of predoctoral scientists and provide them with methodologic training, career development opportunities, and team science skills to function effectively within translational science teams. Program objectives are met through a mentored research component and individualized structured coursework that includes core courses, enhanced experiential components, and courses targeting multidisciplinary team science.

Pending:

National Institutes of Health
(PI: Wiedenheft, co-PI/PD: Voyich) 3.0 Cal Months
Total Federal Funds Requested: $10,773,593
Title: Center for Advanced Molecular Pathogenesis
Goal: CAMP aims to foster recruitment, development, and retention of investigators who share a common interest in translating new discoveries in pathogenesis into new treatments, vaccines, and cures.
Project/Proposal Start and End Date: (MM/YYYY) (if available): 12/2024 – 11/2029

National Institutes of Health
(PI: Wiedenheft, Co-PI: Koutmou) 0.25 Cal Months
Total Federal Funds Requested: $250,000
Title: Host specific evolution of SARS-CoV-2 and the functional consequence of RNA modifications
Goal: We are investigating how the genetic (nucleotide) and epigenetic (RNA modification) profiles of SARS-CoV-2 change upon the propagation and serial passage of the virus into cell lines derived from five different mammalian species. Findings from this work has the potential to reveal how RNA-modifications leads to species specific mutational landscapes.
Project/Proposal Start and End Date: (MM/YYYY) (if available): 09/01/2023 - 08/30/2025

National Institutes of Health
(PI: Berchowitz, Co-PI Wiedenheft)
Total Federal Funds Requested: $1.5 M
Title: Determining the roles of retrotransposon-derived gag-like genes in male and female fertility
Project/Proposal Start and End Date: (MM/YYYY) (if available): 07/01/2024 - 06/30/2025

Previous:

VIRIS Detection Systems
Sponsored Research Agreement (PI: **Wiedenheft**) 10/01/2020 – 09/30/2023
Total award: $600 K 0.2 calendar
Title: Developing a novel CRISPR-based diagnostics for SARS-CoV-2

National Science Foundation - Major Research Instrumentation
NSF-MRI 1828765 (PI: Lawrence, Co-PI: **Wiedenheft**) 10/01/2018 – 09/30/2022
Total award: $2.42 M

Montana Department of Public Health and Human Services
DPHHS: (PI: Walk, Co-PI: Wiedenheft) 6/1/2021 - 5/31/2022
Total award: 2,350,000
Title: SARS-CoV-2 variant identification

City of Bozeman: (PI: Wiedenheft) 9/1/2021 - 8/30/2022
Total award: 180,000
Title: Wastewater surveillance of SARS-CoV-2 in municipal wastewater of Bozeman

Department of Energy
DOE-EE0008247 (PIs: Viamajala, Varanasi; Co-PI: **Wiedenheft)** 09/30/17 – 06/30/22
Total award: $3.0 M
Annual Direct Costs: $40K 0.5 calendar
Role: Genetically engineer algae to produce high concentration of biofuel.
Title: A comprehensive strategy for stable, high productivity cultivation of microalgae with controllable biomass composition
Goals: The University of Toledo, in partnership with Montana State University and the University of North Carolina, will cultivate microalgae in high-salinity and high-alkalinity media to achieve productivities without needing to add concentrated carbon dioxide.

Sponsored Research Agreement with SurGene LLC (PI: **Wiedenheft**)
Total award: $440,000
Title: Developing new methods for enhanced surgical repair of DNA.
Goals: Develop new methods for gene editing and the surgical repair of defective genes.

United State Dept of Agriculture
(PI: Jutlia, Co-PI: Wiedenheft) 09/01/2019 – 08/21/2021
Direct cost: $194,000
Title: Identification of lytic phages for Mycoplasma ovipneumoniae

National Institutes of Health
R21AI130670 (PI: Jutila, Co-PI: **Wiedenheft**) 01/01/2019-12/31/2020
Total costs: $396 K 0.5 calendar
Title: Optimized phage therapy for Brucella infection.
Goal: The major goal of this project is to optimize the use of lytic phage to treat Brucella infection. Represents the grant under consideration for funding.

CATalyst grant (PI: **Wiedenheft**) 01/01/2020 – 12/30/2020
Total costs: $90 K
Title: Repurposing Arc-capsids for delivery of designer RNA cargos for treating monogenic diseases
USDA: MONB00021Animal Health (PI: Jutila) 9/1/2018-8/30/2020
Total costs: $30,000
Subaward to **Wiedenheft** 0.2 calendar
Total subaward: $5,000

Title: Use of innate immune system adjuvants as countermeasures against salmonellosis in calves
Goal: Study the effects of plant polysaccharides and TLR agonists as novel approaches to increase disease resistance in bovine calves.

National Institutes of Health
R01GM110270 - 01A1 (PI: **Wiedenheft**) 10/01/16 – 9/30/20
Total costs: $1.08 M
Annual Direct Costs: $171K 3.0 calendar
Subaward to Co-PI: Lander, Gabriel
Subcontract total costs: $348,000
Title: Structure and function of CRISPR RNA-guided surveillance systems in *P. aeruginosa*
Goals: This proposal aims to determine the mechanism of target recognition, recruitment of trans-acting Cas2/3 nuclease and the mechanism of suppression by virally encoded anti-CRISPRs.

National Institutes of Health
R01GM108888-04 (PI: **Wiedenheft**) 1/01/14 – 12/31/19
Total costs: $1.4 M
Annual Direct Costs: $171K 4.0 calendar
Title: Structure, function and application of CRISPR RNA-guided immunity in bacteria
Goals: This proposal aims to determine the mechanism of target recognition and recruitment kinetics of Cas3 by the RNA-guided surveillance systems in E. coli.

Gordon & Betty Moore Foundation (PI: McCutcheon) 12/01/17 – 11/21/19
Total costs: $2 M
Project Leader: **Wiedenheft** ($100,000 directs) 0.2 calendar
Title: How does a bacterium become part of its host cell? The cell biology of symbiosis.
Goals: Develop new methods for editing non-model organism genomes that will allow us to address fundamental questions about evolution.

Sponsored Research Agreement with Horizon Discovery Ltd. (**Wiedenheft**)
Total costs: $244,000
Title: A CRISPR alternative to genome engineering.
Goals: Develop alternative CRISPR systems for applications in genome engineering.

National Institutes of Health
R21AI130670 (PI: **Wiedenheft**) 9/01/17 – 08/31/19
Total costs: $407,925
Annual Direct Costs: $131K 1.2 calendar
Subaward to Co-PI: Grieshaber, Scott
Subcontract total costs: $21,249
Title: CRISPR generated human genome knockout library for understanding Chlamydial pathogenesis
Goals: This proposal aims to determine human host factors necessary for replication of Chlamydia.

5 P30 GM110732-03 (Quinn) 9/01/16 – 8/31/17
Project Leader: **Wiedenheft, Blake** 0.5 calendar
Title: CRISPR generated human genome knock-out library for studying chlamydial pathogenesis
Goals: This proposal aims to determine human host factors necessary for replication of Chlamydia.

State of Montana Research Initiative - One Medicine 10/1/15– 10/1/16
PI: Voich, Jovanka; Project leader: **Wiedenheft, Blake**
Title: Identifying and Designing New Strategies for Enhanced Genome Engineering

NIH/NIGMS (P20GM103500) 6/1/12 – 6/30/15
PI: Quinn, Mark T Direct Costs (BW): $150,000/yr
Project Leader: **Wiedenheft, Blake**
Title: Mechanisms of RNA-guided Adaptive Immunity in Bacteria
Goals: Determining the requirements for target recognition and the events that result in selective degradation of these invading nucleic acids by the adaptive immune systems in P. aeruginosa.

Bill and Melinda Gates Foundation Grand Challenges (Phase I) 0 5/01/14 – 10/31/15
PI: Walk, Seth Direct Costs: $33,000/yr
Co-PI: **Wiedenheft, Blake** Direct Costs: $33,000/yr
Co-PI: Spence, Jason Direct Costs: $33,000/yr
(OPP1108199- Grand Challenges Explorations Round 12)
Title: Engineering human intestinal organoids to model dysbiosis during enteric dysfunction