

PATRICK R. SECOR, PhD

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Department of Microbiology & Cell Biology
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ACADEMIC APPOINTMENTS

2024 – present Montana State University
Associate Professor
Department of Microbiology & Cell Biology

2023 – 2024 University of Montana
Associate Professor
Division of Biological Sciences
CMMB Graduate Program
Center for Translational Medicine

2017- 2023 University of Montana
Assistant Professor
Division of Biological Sciences
CMMB Graduate Program
Center for Translational Medicine

2013-2017 University of Washington
Cystic Fibrosis Foundation Postdoctoral Fellow
Advisor: Pradeep K. Singh

2011-2013 University of Washington
NIH T32 Postdoctoral Fellow
Advisor: William C. Parks

EDUCATION

2006-2011 Montana State University
Center for Biofilm Engineering
Ph.D. in Biological Sciences/Microbiology
Advisor: Garth A. James

2002-2006 Montana State University
B.S. in Biochemistry, *cum laude*

PEER REVIEWED PUBLICATIONS

<https://scholar.google.com/citations?user=LpTGTwwAAAAJ&hl=en&oi=ao>

*Graduate student co-author, **Undergraduate co-author, ***Postdoc co-author
#P. R. Secor listed as corresponding author

2026 (43) Pershing NL, Brzozowski RS***, Schmidt AK*, Faith DR*, Joyce AC*, Ortiz de Ora L***, Kominsky JD, Dankwardt A, Maciver A, Bell R, Henriques WS, Andersen SE, Wiedenheft B, Casjens SR, Duerkop BA, Round JL, **Secor PR#**. A prophage-encoded sRNA limits phage infection of adherent-invasive *E. coli*. *PLoS Pathogens*. 2026;22(1):e1013836. doi: 10.1371/journal.ppat.1013836. PMID: 41481766.

2025

(42) Pourtois JD, Haddock NL, Gupta A, Khosravi A, Martinez HA, Schmidt AK, et al. New *Pseudomonas* infections drive Pf phage transmission in CF airways. *JCI Insight*. 2025;10(11):e188146. Epub 20250422. doi: 10.1172/jci.insight.188146. PubMed PMID: 40261708.

(41) Fitzpatrick AD, Taylor VL, Patel PH, Faith DR, Secor PR, Maxwell KL. Phage reprogramming of *Pseudomonas aeruginosa* amino acid metabolism drives efficient phage replication. *mBio*. 2025;16(3):e0246624. Epub 20250207. doi: 10.1128/mbio.02466-24. PubMed PMID: 39918338.

(40) Burgener EB, Gupta A, Nakano K, Gibbs SL, Sommers ME, Khosravi A, Bach MS, Dunn C, Spano J, Secor PR, Tian L, Bollyky PL, Milla CE. Pf bacteriophage is associated with decline in lung function in a longitudinal cohort of patients with cystic fibrosis and *Pseudomonas* airway infection. *J Cyst Fibros*. 2025;24(2):345–352. Epub 20241025. doi: 10.1016/j.jcf.2024.09.018. PubMed PMID: 39490215.

2024

(39) Burgener EB, Cai P, Kratochvil MJ, Rojas-Hernandez LS, Joo NS, Gupta A, Secor PR, Heilshorn SC, Spakowitz AJ, Wine JJ, Bollyky PL, Milla CE. The lysogenic filamentous *Pseudomonas* bacteriophage phage Pf slows mucociliary transport. *PNAS Nexus*. 2024:pgae390.

(38) Chen Q, Cai P, Chang THW, Burgener E, Kratochvil MJ, Gupta A, Hargil A, Secor PR, Nielsen JE, Barron AE, Milla C, Heilshorn SC, Spakowitz AJ, Bollyky PL. 2024. Pf bacteriophages hinder sputum antibiotic diffusion via electrostatic binding. *Science Advances*, 10 (22), ead15576

(37) Schmidt AK*, Schwartzkopf CM*, Pourtois JD, Burgener E, Faith DR*, Joyce A**, Lamma T**, Kumar G, Bollyky PL, Secor PR#. 2024. Targeted deletion of Pf prophages from diverse *Pseudomonas aeruginosa* isolates impacts quorum sensing and virulence traits. *Journal of Bacteriology*, 2024:e0040223, doi: 10.1128/jb.00402-23

(36) Copeland CJ*, Roddy JW, Schmidt AK*, Secor PR, Wheeler TJ. 2024. VIBES: A Workflow for Annotating and Visualizing Viral Sequences Integrated into Bacterial Genomes. *NAR Genomics and Bioinformatics*, 6 (2), doi.org/10.1093/nargab/lqae030

(35) Faith DR*, Kinnersley M, Brooks DM, Drecktrah D, Hall LS, Luo E, Santiago-Frangos A, Wachter J, Samuels DS, Secor PR#. 2024. Characterization and genomic analysis of the Lyme disease spirochete bacteriophage ϕ BB-1. *PLoS Pathogens*, 2024;20(4):e1012122. doi: 10.1371/journal.ppat.1012122

(34) Román-Cruz VC*, Miller SM, Schoener RA, Lukasiewicz C, Schmidt AK*, DeBuysscher BL, Burkhart D, Secor PR, Evans JT. 2024. Adjuvanted Vaccine Induces Functional Antibodies against *Pseudomonas aeruginosa* Filamentous Bacteriophages. *Vaccines* 12:115

(33) Schwartzkopf, C.M.*, Taylor, V., Groleau, M-C., Faith, D. R. *, Schmidt, A. K. *, Lamma, T. **, Brooks, D. M., Déziel, E., Maxwell, K., and Secor, P. R. #. Inhibition of PQS signaling by the Pf bacteriophage protein PfsE enhances viral replication in *Pseudomonas aeruginosa*. *Molecular Microbiology*. 2024; doi:10.1111/mmi.15202

2023

(32) de Mattos CD*, Faith DR*, Nemudryi AA, Schmidt AK*, 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#. Polyamines and linear DNA mediate bacterial threat assessment of bacteriophage infection. *Proc Natl Acad Sci U S A*. 2023;120(9):e2216430120. doi: 10.1073/pnas.2216430120

(31) Schwartzkopf CM*, Robinson AJ**, Ellenbecker M, Faith DR*, Schmidt AK*, Brooks DM, Lewerke L*, Voronina E, Dandekar AA, Secor P. R. # Tripartite interactions between filamentous Pf4 bacteriophage, *Pseudomonas aeruginosa*, and bacterivorous nematodes. *PLoS Pathog*. 2023;19(2):e1010925. doi: 10.1371/journal.ppat.1010925

- (30) Sapiro AL, Hayes BM, Volk RF, Zhang JY, Brooks DM, Martyn C, Radkov A, Zhao Z, Kinnersley M, **Secor P. R.**, Zaro BW, Chou S. Longitudinal map of transcriptome changes in the Lyme pathogen *Borrelia burgdorferi* during tick-borne transmission. *eLife*. 2023;12:RP86636. <https://doi.org/10.7554/eLife.86636>
- (29) Wachter, J., Cheff, B., Hillman, C., Carracoi, V., Dorward, D.W., Martens, C., Barbian, K., Nardone, G., Olano, R.L., Kinnersley, M, **Secor, P.R.**, and Rosa, P.A. Coupled induction of prophage and virulence factors during tick transmission of the Lyme disease spirochete. *Nature Communications*, 2023 <https://doi.org/10.1038/s41467-023-35897-3>
- (28) M. T. van Rossem, S. Wilks, **P. R. Secor**, M. Kaczmarek, G. D'Alessandro. Homogenization modelling of antibiotic diffusion and adsorption in viral liquid crystals. *Royal Society Open Sci*, Vol 10, Issue 1, Jan. 2023, doi.org/10.1098/rsos.221120
- (27) M. S. Bach, C. R. de Vries, A. Khosravi, J. M. Sweere, M. C. Popescu, Q. Chen, S. Demirdjian, A. Hargil, J. D. Van Belleghem, G. Kaber, M. Hajfathalian, E. B. Burgener, D. Liu, Q. Tran, T. Dharmaraj, M. Birukova, V. Sunkari, S. Balaji, N. Ghosh, S. S. Steiner, M. S. El Masry, S. G. Keswani, N. Banaei, L. Nedelec, C. K. Sen, V. Chandra, **P. R. Secor**, G. A. Suh, P. L. Bollyky. Filamentous bacteriophage delays healing of *Pseudomonas*-infected wounds. *Cell Reports Medicine*, Vol 3, Issue 6, June 2022, <https://doi.org/10.1016/j.xcrm.2022.100656>
- (26) **Secor, P. R.**[#], Michaels, L. A., Bublit, D.C., Jennings, L.K., Singh, P.K. (2022). The Depletion Mechanism Actuates Bacterial Aggregation by Exopolysaccharides and Determines Species Distribution & Composition in Bacterial Aggregates. *Front. Cell. Infect. Microbiol.* <https://doi.org/10.3389/fcimb.2022.869736>
- (25) Faith, D*., Kinnersley, M., Schwartzkopf, C.M*., de Mattos, C.D*., Schmidt, A.K*., and **Secor, P.R.**[#]. (2022). Complete Genome Sequence of the N4-like *Pseudomonas aeruginosa* Bacteriophage vB_PaeP_CMS1. *Microbiol Resour Announc*, e0023922. [10.1128/mra.00239-22](https://doi.org/10.1128/mra.00239-22)
- (24) van Rossem, M., Wilks, S., Kaczmarek, M., **Secor, P.R.**, and D'Alessandro, G. (2022). Modelling of filamentous phage-induced antibiotic tolerance of *P. aeruginosa*. *PLoS One* 17, e0261482. [10.1371/journal.pone.0261482](https://doi.org/10.1371/journal.pone.0261482).
- (23) A.K. Schmidt*, A.D. Fitzpatrick, C. S. Schwartzkopf*, D.R. Faith*, L.K. Jennings, A. Coluccio, D.J. Hunt**, L.A. Michaels, D.W. Dorward, J. Wachter, P.A. Rosa, K.L. Maxwell, **P.R. Secor**[#]. A Filamentous Bacteriophage Protein Inhibits Type IV Pili to Prevent Superinfection of *Pseudomonas aeruginosa*. *mBio*, 2022; <https://doi.org/10.1128/mbio.02441-21>
- (22) Kirsch JM, Brzozowski RS***, Faith D.R.*, Round JL, **Secor PR**, Duerkop BA. Bacteriophage-Bacteria Interactions in the Gut: From Invertebrates to Mammals. *Annu Rev Virol.* 2021;8(1):95-113. [doi:10.1146/annurev-virology-091919-101238](https://doi.org/10.1146/annurev-virology-091919-101238).
- (21) Jennings LK, Dreifus JE, Reichhardt C, Storek KM, **Secor PR**, Wozniak DJ, Hisert KB, Parsek MR. *Pseudomonas aeruginosa* aggregates in cystic fibrosis sputum produce exopolysaccharides that likely impede current therapies. *Cell Rep.* 2021;34(8):108782. [doi: 10.1016/j.celrep.2021.108782](https://doi.org/10.1016/j.celrep.2021.108782)
- (20) E. B. Burgener, **P. R. Secor**, M. C. Tracy, J. M. Sweere, E. M. Bik, C. E. Milla, and P. L. Bollyky. Methods for Extraction and Detection of Pf Bacteriophage DNA from the Sputum of Patients with Cystic Fibrosis, *Phage: Therapy, Applications, and Research*, June 2020, doi.org/10.1089/phage.2020.0003
- (19) **P. R. Secor**[#] and A. A. Dandekar, More than Simple Parasites: The Sociobiology of Bacteriophages and Their Bacterial Hosts. *mBio*, March 10, 2020, <https://mbio.asm.org/content/11/2/e00041-20>

2022

2021

2020

(18) **P. R. Secor**, E B Burgener, M Kinnersley, L K Jennings, V Roman-Cruz*, M Popescu, J D Van Bellegheem, N Haddock, C Copeland**, L A Michaels, C R De Vries, Q Chen, J Pourtois, T J Wheeler, C E Milla, P L Bollyky. Pf Bacteriophage and Their Impact on *Pseudomonas* Virulence, Mammalian Immunity, and Chronic infections. *Front. Immunol.*, 21 February 2020
doi.org/10.3389/fimmu.2020.00244

2019

(17) J M. Sweere, H Ishak, V Sunkari, M S. Bach, R Manasherob, K Yadava, S. M. Ruppert, C. K. Sen, S Balaji, S. G. Keswani, **P. R. Secor**, and Paul L. Bollyky. (2019) The Immune Response to Chronic *Pseudomonas aeruginosa* Wound Infection in Immunocompetent Mice. *Advances in Wound Care*, Vol. 8

(16) E. B. Burgener, J. M. Sweere, M. S. Bach, **P. R. Secor**, N Haddock, L. K. Jennings, R. L. Marvig, H. K. Johansen, E. Rossi, X. Cao, L. Tian, L. Nedelec, S. Molin, P. L. Bollyky, and C. E. Milla. (2019) Filamentous bacteriophages are associated with chronic *Pseudomonas* lung infections and antibiotic resistance in cystic fibrosis. *Science Translational Medicine*, Vol. 11, Issue 488, eaau9748

(15) J. M. Sweere, H. Ishak, M. S. Bach, V. Sunkari, G. Kaber, R. Manasherob, G. A. Suh, M. Popescu, P. L. Marshall, M. Birukova, E. Katznelson, D. V. Lazzareschi, S. Balaji, S. Keswani, T. R. Hawn, **P. R. Secor**, and P. L. Bollyky. (2019) Filamentous Bacteriophage Suppress Clearance of Bacterial Infection. *Science*, Vol. 363, Issue 6434, eaat9691

2018

(14) **P. R. Secor**[#], M., L.A., Ratjen, A., Jennings, L.K., Singh, P.K. Entropically-driven aggregation of bacteria by host polymers promotes antibiotic tolerance in *Pseudomonas aeruginosa*. *PNAS*, Oct 2018, 201806005; DOI:10.1073/pnas.1806005115

2017

(13) Jorth, P.A., McLean, K., Ratjen, A., **Secor, P.R.**, Bautista, G.E., Ravishankar, S., Rezayat, A., Garudathri, J., Harrison, J.J., Harwood, R.A., Penewit, K., Waalkes, A., Singh, P.K., Salipante, S.J. (2017) Evolved aztreonam resistance is multifactorial and can produce hypervirulence in *Pseudomonas aeruginosa*. *mBio*, 8:e00517-17

(12) Nazik, H., Joubert, L.M., **Secor, P.R.**, Sweere, J.M., Bollyky, P.L., Sass, G., Cegelski, L., Stevens, D.A. (2017) *Pseudomonas* Phage Inhibition of *Candida albicans*. *Microbiology*, 163 (11), 1568-1577

(11) **Secor P.R.**[#], Sass G, Nazik H, Stevens DA. (2017) Effect of acute predation with bacteriophage on intermicrobial aggression by *Pseudomonas aeruginosa*. *PLoS One*. 16;12(6):e0179659. doi: 10.1371/journal.pone.0179659

(10) **Secor, P.R.**[#], Michaels, L.A., Smigiel, K.S., Rohani, M.G., Jennings, L.K., Hisert, K.B., Arrigoni, A., Braun, K.R., Birkland, T.P., Hallstrand, T.S., Lai, Y., Bollyky, P.L., Singh, P.K., Parks, W.C. (2017) Filamentous bacteriophage produced by *Pseudomonas aeruginosa* alters the inflammatory response and promotes non-invasive infection *in vivo*. *Infection and Immunity*, vol. 85, issue 1. Featured on journal cover.

2016

(9) Penner, J.C., Ferreira, J.A.G., **Secor, P.R.**, Sweere, J.M., Birukova, M.K., Joubert, L.M., Haagensen, J.A.J., Garcia, O., Malkovskiy, A.V., Kaber, G., Nazik, H., Manasherob, R., Spormann, A.M., Clemons, K.V., Stevens, D.A., Bollyky, P.L. (2016) Pf4 Bacteriophage Produced by *Pseudomonas aeruginosa* Inhibits *Aspergillus fumigatus* Metabolism via Iron Sequestration. *Microbiology*, 162, 1583-1594

(8) **Secor, P.R.**[#], Jennings, L.K., Michaels, L.A., Sweere, J.M., Singh, P.K., Parks, W.C., Bollyky, P.L. (2016) Biofilm assembly becomes crystal clear – filamentous bacteriophage organize the *Pseudomonas aeruginosa* biofilm matrix into a liquid crystal. *Microbial Cell*, 3(1): 49-52. Featured on journal cover.

2015

(7) **Secor, P.R.**[#], Sweere, J.M., Michaels, L.A., Malkovskiy, A.V., Lazzareschi, D., Katznelson, E., Rajadas, J., Birnbaum, M.E., Arrigoni, A., Braun, K.R., Evanko, S.P., Stevens, D.A., Kaminsky, W., Singh, P.K., Parks, W.C., Bollyky, P.L. (2015)

Filamentous Bacteriophage Promote Biofilm Assembly and Function. *Cell Host & Microbe*, 18(5): 549-59

(6) Jennings L.K., Storek K.M., Ledvina H.E., Coulon C., Marmont L.S., Sadovskaya I., **Secor, P.R.**, Tseng B.S., Scian M., Filloux A., Wozniak D.J., Howell P.L., Parsek M.R. (2015) Pel is a cationic exopolysaccharide that cross-links extracellular DNA in the *Pseudomonas aeruginosa* biofilm matrix. *Proc Natl Acad Sci U S A*, 112(36): 11353-8

2012

(5) **Secor, P. R.** #, Jennings, L. K., James, G. A., Kirker, K. R., Pulcini, E. D., McInnerney, K., Gerlach, R., Livinghouse, T., Hilmer, J. K., Bothner, B., Fleckman, P., Olerud, J. E., Stewart, P. S. (2012) Phevalin (aureusimine B) production by *Staphylococcus aureus* biofilm and impacts on human keratinocyte gene expression, *PLoS One* 7(7) e40973

2011

(4) **Secor, P. R.** #, James, G. A., Fleckman, P., Olerud, J. E., McInnerney, K., and Stewart, P.S. (2011) *Staphylococcus aureus* Biofilm and Planktonic cultures differentially impact gene expression, MAPK phosphorylation, and cytokine production in human keratinocytes. *BMC Microbiol*, 11:143

2009

(3) Kirker, K.R., **Secor, P.R.**, James, G.A., Fleckman, P., Olerud, J.E., Stewart, P.S., (2009) Loss of viability and induction of apoptosis in human keratinocytes exposed to *Staphylococcus aureus* biofilms in vitro. *Wound Repair Regen*, 17(5): 690-9

2008

(2) Dowd, S.E., Sun, Y., **Secor, P.R.**, Rhoads, D.D., Wolcott, B.M., James, G.A., Wolcott, R.D. (2008) Survey of bacterial diversity in chronic wounds using pyrosequencing, DGGE, and full ribosome shotgun sequencing. *BMC Microbiol*, 8: 43

(1) James, G.A., Swogger, E., Wolcott, R., Pulcini, E., **Secor, P.R.**, Sestrich, J., Costerton, J.W., Stewart, P.S. (2008) Biofilms in chronic wounds. *Wound Repair Regen*, 16(1): 37-44. Cited ~ 2,000 times.

INVITED PREVIEWS / COMMENTARIES / EDITORIALS

2023

Schmidt, A.K.*, Faith, D.R.*, and **Secor, P.R.**#. PICI Thieves: Molecular Piracy and Cooperation. *Cell Host & Microbe*, 31(1), January 2023.

2019

Bollyky, P.L. and **Secor, P.R.**#. (2019) The Innate Sense of Bacteriophages. *Cell Host & Microbe*, 25(2).

PREPRINTS

2026

Finnerty R, Lim C, **Secor PR**, Marshall CW. Long-term exposure to polyamines leads to bacteriophage resistance in *Pseudomonas aeruginosa*. *bioRxiv*. Posted July 16, 2026. doi: 10.64898/2026.07.14.738440.

FUNDING AWARDED

2026 – present

NIH/NIGMS **R25** GM152359 (**Co-I: Secor, PR**), PREP-MT: Providing Research Education for Postbaccalaureate Trainees in Montana. Co-Investigator since July 2026.

2025 – 2027

NIH/NIAID Administrative Supplement to contract HHSN272201800048C (PI: Evans, JT, **Co-I Secor, PR**), Adjuvanted Lyme disease vaccine. \$400,000 direct.

2025

Office of Naval Research Long Range Broad Agency Announcement for Navy and Marine Corps Science & Technology (PI: Serban, M, **Co-I: Secor, PR**), Engineered Systems for Burn Research. Award duration reduced to one year.

2024 – 2029

NIH/NIAID **R01** AI173045 (**PI, Secor, PR**), Phage-mediated horizontal gene transfer in *Borrelia burgdorferi*. \$3,555,141 total

2023 – 2024

University of Montana Center for Translational Medicine Pilot Grant (**PI, Secor, PR**), Bacteriophage lysins as novel Lyme disease therapeutics. \$100k direct.

2022 – 2024	NIH/NIAID Administrative Supplement to contract HHSN272201800048C (PI: Evans, JT, Co-I Secor, PR), Adjuvanted Lyme disease vaccine. \$1M direct
2022 – 2023	NIH/INBRE Faculty Research Grant (PI Secor, PR) Defining the immunogenicity of tick saliva in mice and men. \$50k direct.
2022 – 2023	NIH/NIGMS COBRE P30 GM140963 (PI: Bowler, B, Subaward PI: Secor, PR), Pilot Award, Structural variation of small phage proteins. \$35k direct
2021	IDeA National Resource for Proteomics Voucher Award. Awarded March 2, 2021.
2020 – 2025	NIH/NIDDK R01 DK124317 (PI: Round, J.L., Co-I Secor, PR), Bacteriophage pathobiology of inflammatory bowel disease. \$2,539,200 total
2020 – 2022	NIH/NIAID R21 AI151597 (PI: Secor, PR), Targeting a ubiquitous spirochete bacteriophage to prevent Lyme disease. \$275k direct
2018 – 2025	NIH/NIAID R01 AI138981 (PI: Secor, PR), Immunization against filamentous bacteriophages to prevent bacterial infection. \$5,618,222 total (includes no-cost extension)
2018	University of Montana Genomics Core–Illumina Mini-Grant (PI, Secor, P.R.). \$5k direct
2017 – 2021	NIH/NIGMS COBRE P30 GM140963 (PI: Sprang, S, Subaward PI: Secor, PR) Young Investigator Award. \$300k direct
2017 – 2020	NIH/NIAID Career Transition Award K22 AI125282 (PI: Secor, PR) Understanding polymer-induced bacterial aggregation and antimicrobial tolerance. \$250k direct
2017 – 2019	Dr. Ralph and Marian Falk Medical Research Trust – Catalyst Award (PI Bollyky, P.L., Co-I Secor, P.R.). \$1M direct
2016	The Charlie Moore Endowed Fellowship for Cystic Fibrosis Research, (PI, Secor, P.R.), \$10,000 direct.
2015 – 2017	Cystic Fibrosis Foundation (National) Postdoctoral Fellowship
2013 – 2014	Cystic Fibrosis Foundation Fellowship, Seattle Chapter, Postdoctoral Fellowship
2013	Stanford University Immunology Postdoctoral Training Grant, awarded, but declined 5T32 AI007290-29 (NIH/NIAID)
2011	University of Washington Pulmonary Postdoctoral Training Grant 5T32 HL007287-33 (NIH/NHLBI)

GRANTS PENDING REVIEW / RESUBMISSION

NIH R21 (PI: Secor, PR), DRT2 project. Submitted February 16, 2026.

NIH R01 (PI: Secor, PR), Leader peptide project. Submitted 2026; **scored at the 2nd percentile**.

NIH R01 (PI: Pershing, NL; Secor laboratory subaward), NEC project, University of Utah collaboration. Submitted 2026.

NIH/Office of the Director Transformative Research Award R01OD042048 (**MPI, Secor, PR**), Phage-Immunity Crosstalk in Intestinal Homeostasis. 2026 – 2031. Submitted September 3, 2025. \$8.4M total cost over 5 years.

HHS-NIH-NIAID-BAA2025-1 **NIH Contract (MPI, Secor, PR)**, Clinical Development of a Multivalent (PaV-T4) Vaccine Targeting *Pseudomonas aeruginosa* ESKAPE Pathogen. Reviewed, pending Administrative Evaluation. \$18.59M total funds over 5 years.

NIH/NIAID **R01** AI200153 (PI: **Secor, PR**), The Role of Inoviruses in Bacterial Immunity. \$3.78M total cost over 5 years.

NIH/NIAID **R21** AI199233, (PI: **Secor, PR**), Phollowing and harnessing phage outbreaks in the tick microbiome for vector and pathogen control. \$398,750 total cost over 2 years. Resubmitted 2026.

NIH/NIAID **R21** AI199232, (PI: **Secor, PR**), Phage-Induced Biofilm Dispersal and Transmission Dynamics in *Leptospira*. \$398,750 total cost over 2 years.

AWARDS & RECOGNITION

2025 – present	Standing member, NIH Bacterial Host Interactions (BHI) Study Section
2025	Press coverage of NIH R01 Lyme disease award: Mountain Journal, Bozeman Daily Chronicle, Montana State University News
2025	Blavatnik Award Nominee, Montana State University
2025	Featured in Mountain Journal, “Patrick Secor’s ‘Ick Factor’: Ticks, Lyme and the Growing Climate Risk,” December 2, 2025.
2023	Blavatnik Award Nominee, Biological Sciences, University of Montana
2021	Faculty Merit Award for outstanding research productivity, University of Montana
2020	Faculty Merit Award for outstanding research productivity, University of Montana
2020	Co-moderator, Life at the Cutting Edge, ASM Microbe, Chicago, IL (canceled, COVID-19)
2018	Searle Scholar Nominee, University of Montana
2018	Young Investigator Award, Center for Biofilm Engineering, Montana State University
2017	Young Investigator Award, Center for Biomolecular Structure and Design, University of Montana
2016	NIH/NIAID Career Transition Award (K22)
2016	The Charlie Moore Endowed Fellowship for Cystic Fibrosis Research
2015-2017	Cystic Fibrosis Foundation (National) Postdoctoral Fellowship
2013-2014	Cystic Fibrosis Foundation Postdoctoral Fellowship, Seattle Chapter
2012-2013	NIH T32 Postdoctoral Fellow
2009	W.G. Characklis Scholarship for Outstanding Ph.D. Student

INTELLECTUAL PROPERTY

2026	RPP. U.S. provisional patent application filed June 2026.
2026	GATWAY. U.S. provisional patent application filed May 2026.
2024	US Patent 11,911,472 B2 – Monoclonal antibody and vaccine targeting filamentous bacteriophage. Granted February 27, 2024; continuation of US Patent 10,835,607. Assigned to Inimmune Corp.
2024	US Patent Application Publication 2024/0325517 A1 – Compositions and Methods Targeting Filamentous Bacteriophage. Published October 3, 2024; claims priority to provisional application 63/078,777 (September 15, 2020). Licensed to Inimmune Corp.
2021	PCT/US2020/063086; Antibacterial Carbohydrate Vaccine.
2020	US Patent 10,835,607 - Monoclonal antibody and vaccine targeting filamentous bacteriophage. Granted November 17, 2020. Licensed to Inimmune Corp.

TEACHING

Fall 2026	Instructor, Microbial Physiology BIOM 450/520, Montana State University
Fall 2026	Guest lecturer, BIOB 499, Montana State University; two lectures, week of September 1, 2026.
Spring 2026	Instructor, Microbiology Seminar BIOM 494, Montana State University
Spring 2026	Guest lecturer, BIOM 499 (Emma Loveday), Montana State University, February 3, 2026.

<i>Fall 2025</i>	Instructor, Microbial Physiology BIOM 450/520, Montana State University; redesigned course content and instruction.
<i>Spring 2025</i>	Instructor, Microbiology Seminar BIOM 494, Montana State University
<i>Spring 2025</i>	Guest lecturer, Medical Bacteriology (Tyler Nygaard), Montana State University, April 8, 2025.
<i>Fall 2018-2024</i>	Instructor, Microbial Physiology (plus lab) BIOM 450/451, University of Montana
<i>Spring 2022</i>	Guest lecturer, BCHM 294, University of Montana, April 12, 2022.
<i>Spring 2020</i>	Co-instructor, The Diversity of Life BIOB 170, University of Montana
<i>Fall 2019</i>	Guest lecturer, HUSC 194, University of Montana, November 12, 2019.
<i>Summer 2018</i>	HHMI Summer Institute on Scientific Teaching
<i>Spring 2018</i>	Guest lecturer, BIOM 410 Microbial Genetics, University of Montana; two lectures, week of April 2, 2018.
<i>Spring 2010</i>	Co-instructor, Microbes in the Environment, Montana State University
<i>2007-2008</i>	Teaching Assistant, Molecules to Cells, Montana State University

MENTORING

<i>Graduate students</i>	Camilla de Mattos, PhD, graduated Jan. 2023; postdoctoral researcher, OHSU Caleb Schwartzkopf, PhD, graduated June 2023; Assistant Professor, Simpson University Valery Roman-Cruz, co-advised with Dr. Jay Evans, graduated August 2023; Program Manager, Montana Department of Public Health and Human Services Amelia Schmidt, PhD, defended September 20, 2024; postdoctoral researcher, Stanford University. 2022 NSF GRFP honorable mention; Dr. Linda Phillips Knoblock Fellowship (2023); Dr. Mitsuru J. (Jim) Nakamura Graduate Scholarship in Microbiology (2024). Dominick Faith, PhD, graduated 2026; postdoctoral researcher with Paul Bollyky, Stanford University. 2023 NSF GRFP recipient; Dr. Linda Phillips Knoblock Fellowship (2024). Alex Joyce, MCB PhD program, Montana State University, 2024–April 2026 (withdrew April 2026); TL1 award recipient, 2025. Albert Burkle, PhD student, MCB Program, Montana State University, January 2026–present (rotation, 2025). Angela Voelker, PhD student, MCB Program, Montana State University, July 2026–present.
<i>Graduate Committees</i>	Montana State: Dominick Faith, Alex Joyce, Matt Abbott, Shishir Pandey, Angela Voelker, Zoe Seaford University of Montana: Camilla de Mattos, Caleb Schwartzkopf, Valery Roman-Cruz, Amelia Schmidt, Conner Copeland, Shaun Wachter, Kelley Van Vaerenberghe, Christopher Pierpont, John Statz, Ian Bailey,
<i>External/International Graduate Committees</i>	Nanami Kubota (University of Pittsburgh, Advisor Vaughn Cooper), Natisha Menton (Amrita University, India, advisor Geetha Kumar), Marion Bichet (Monash University, Australia, advisor Jeremy Barr)
<i>Postdocs</i>	Dr. Robert Brzozowski (2020–2024; now Senior Scientist, BioSqueeze Inc.); Dr. Liz Ortiz de Ora (2025–February 2026; promoted to Assistant Research Professor).
<i>Research Faculty</i>	Dr. Margie Kinnersley; now Senior Scientist, FYR Diagnostics Dr. DeAnna Bublitz; now Scientific Review Officer, NIH Dr. Reetika Chaurasia; INBRE Faculty Research Award, 2026 Dr. Liz Ortiz de Ora; Assistant Research Professor, February 9, 2026–present; COBRE CAMP Pilot Award, 2026

<i>Research Staff</i>	Dr. Iván Muñoz Gutiérrez, Research Scientist, February 2026–present.
<i>Postbaccalaureate</i>	Teaghan Arnott and John Kominsky, PREP-MT scholars.
<i>Undergraduate</i>	Teaghan Arnott (INBRE summer fellowship, 2025); Elaina Lewis; Lydia Hampton; Bella Mulder.
<i>Selected honors</i>	Camilla de Mattos: Center for Phage Technology Award for best phage abstract, ASM Microbe, 2022; Nakamura Graduate Scholarship, 2021; Toelle-Bekken Family Memorial Fund Award, 2020–2021. Dominick Faith: Toelle-Bekken Family Memorial Fund Award and research/travel support, 2022. Robert Brzozowski: Young Investigator Award, Center for Biofilm Engineering, Montana State University, 2023. Autumn Robinson: UM Conference on Undergraduate Research Award, 2018. Elise Wells: Center for Translational Medicine summer internship, 2022.

INVITED SEMINARS, CONFERENCES, & SYMPOSIUMS

2026	-CalTech ChE seminar, planned visit February 2027
2025	- MSU ASM Chapter , student-invited speaker, Montana State University, October 30, 2025. - Conference on Bacteriophages: Biology, Dynamics, and Therapeutics , IAS–USA, Washington, DC, October 12–14, 2025. <i>Caenorhabditis elegans</i> as a Model System for Phage Biology. -Montana Biofilm Meeting, Montana State University , July 2025 - REU Faculty Talk , Montana State University, June 17, 2025.
2024	-Center for Biofilm Engineering Seminar Series, Montana State University , Nov 2024. -Department of Microbiology and Immunology Seminar Series, Montana State University , Oct 2024. - Bacterial Cell Surfaces GRC , invited speaker, University of Southern Maine, June 23–28, 2024. -Department of Microbiology and Immunology, University of Minnesota , Minneapolis, MN, Feb. 2024. -Departmental Seminar, Department of Microbial Infection and Immunity, College of Medicine, Ohio State University. May 2024. -Biological Sciences seminar series, UNC Charlotte , Charlotte, NC, February 5, 2024. - Ecology and Evolution Seminar , University of Oregon, January 26, 2024.
2023	-Program in Microbiology and Immunology Seminar Series, University of Pittsburgh , School of Medicine, October 2023. *Student invited speaker -Department of Microbiology and Immunology Seminar Series, Montana State University , April 2023. -Research Seminar, NIH Division of Intramural Research, NIAID Rocky Mountain Laboratories , Hamilton, MT, Feb. 2023
2022	-Departmental Seminar, Department of Plant and Microbial Biology at UC Berkeley , Nov 2022 -ALARM International Symposium, Amrita School of Biotechnology , India, Nov. 2022 -Thinking like a microbe: a tribute to Stanley Falkow symposium, NIH Division of Intramural Research, NIAID Rocky Mountain Laboratories , Hamilton, MT, July 2022 -18th International Conference on Pseudomonas , Atlanta, Georgia
2021	-Center for Biomolecular Structure and Dynamics Research Symposium, University of Montana
2020	- University of Colorado Anschutz Microbiology Seminar Series - American Society for Microbiology 2020 Microbe Meeting, Co-moderator, in-depth symposium Life at the Cutting Edge *cancelled, covid - Pseudomonas Seminar Series , online seminar series organized by Urvish Trivedi (University of Copenhagen) and Cassandra Nelson (University of Maryland).

2019	-Friday Medical Conference / Grand Rounds, University of Montana and regional healthcare facilities, January 10, 2020. -NIAID Rocky Mountain Laboratories Summer Research Symposium, Hamilton, MT -University of Utah Department of Pathology Seminar Series, University of Utah -Division of Biological Sciences Seminar Series, University of California, San Diego -Department of Microbiology and Immunology Seminar Series, Montana State University -Integrative Microbiology Seminar Series, University of California, San Francisco -Center for Biomolecular Structure and Dynamics Research Symposium, University of Montana -Institute for Infection, Immunology, and Inflammation Seminar Series, Vanderbilt University
2018	-Center for Biomolecular Structure and Dynamics Research Symposium, University of Montana -Organismal Biology, Ecology, and Evolution Brewery Chalk Talk Series, University of Montana
2017	-Montana Biofilm Meeting, Center for Biofilm Engineering, Montana State University
2016	-Harkins High School Science Fusion Lecture, University of Montana -Pacific Northwest Epithelial Biology Meeting, University of Washington -Cystic Fibrosis Foundation Retreat, University of Washington
2015	-North American Cystic Fibrosis Conference, Phoenix, AZ
2014	-North American Cystic Fibrosis Conference, Atlanta, GA
2012	-Cystic Fibrosis Foundation Retreat, University of Washington
2008	-Invited Speaker, Molecular Probes, Invitrogen, Eugene, OR
2006-2010	-Montana Biofilm Meeting, Center for Biofilm Engineering, Montana State University

SELECTED CONFERENCE ABSTRACTS

2025	Faith DR*, Arnott T**, Secor PR . Missing the Mucoids: AlgU-Mediated Phage Tolerance in <i>Pseudomonas aeruginosa</i> . Topics in Antiviral Medicine . 33(5 Suppl):699. Abstract 142, Conference on Bacteriophages: Biology, Dynamics, and Therapeutics.
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PROFESSIONAL ACTIVITIES

Editorial work

Guest Editor, *PLoS Pathogens*, February 2024–present
Associate Editor, *mBio*, July 1, 2025–June 30, 2028
Handling Editor, *FEMS Microbes*, December 2025–present

Referee for Professional Publications

Cell Host & Microbe, *Cell Reports*, *iScience*, *Science Advances*, *eLife*, *EMBO Journal*, *Virulence*, *Nature Biofilms and Microbiomes*, *Frontiers in Microbiology*, *Genome Evolution*, *Virus Evolution*, *mBio*, *Journal of Bacteriology*, *Applied and Environmental Microbiology*, *mSphere*, *Journal of Virology*, *Soft Matter*, *PLoS ONE*, *Spectrum*, *Viruses*, *PLoS Biology*, *PLoS Pathogens*, *Nature Communications*, *PNAS*, *Curiositas*.

Grant review

2026 Reviewer, Center for Translational Medicine Pilot Grants
2025–present Standing member, NIH BHI Study Section
2025 *ad hoc* member, NIH IMII Study Section
2025 *ad hoc* member, NIH ODCS study section
2024 *ad hoc* member, NIH BHI Study Section
2023 *ad hoc* member, NIH NIAID F31 Study Section
2022 *ad hoc* member, NIH NIAID P01 Study Section
2021 *ad hoc* member, NIH DDR Study Section
2021 *ad hoc* reviewer, Cystic Fibrosis Foundation
2020 *ad hoc* member, NIH Special Emphasis Study Section

Professional Society Affiliations

American Society for Microbiology

Departmental Service

Chair: Environmental Microbiology Faculty Search (2025)

Member: Graduate Admissions Committee, Montana State University (2024- present)

Member: Graduate Admissions Committee, University of Montana (2017- 2024, *Chair* 2022-2024)

Member: Neuroscience Faculty Search Committee, University of Montana (2019)

Member: Microbiology Curriculum Advisory Committee, University of Montana (2022-2024)

Member: DBS Curriculum Committee, University of Montana (2022-2024)

Member: Center for Translational Medicine Faculty Advisory Council, University of Montana (2019-2024)

College Service

Undergraduate Award and Scholarship Committee, University of Montana (2019)

University Service

Faculty senate: MCB representative (2025 – present)

Member, Faculty Senate Steering Committee (2026–2027)

Institutional Biosafety Committee, University of Montana (2021-2024)

State Service

Appointed Member, Rare Disease Advisory Council, State of Montana, January 2026–present; representative of a Montana academic research institution receiving grant funding for rare disease research.

OUTREACH

2018-2020

My lab has hosted numerous high school students through the local Advanced Problems in Science Program. High school students work on a research project for an entire semester and then share their findings with their peers back at their high schools and at a poster session at the University of Montana.

2018 & 2019

My lab hosted multiple scientific outreach activities with the Ray Bjork Learning Center's PEAK Program for gifted and talented elementary-aged children.

2017

Harkins High School Science Fusion Lecture, University of Montana

2009-2011

Instructor, American Indian Research Opportunities (AIRO) educational outreach program for Native American students interested in STEM-based careers, Montana State University