



## Michael Fischbach

Associate Professor of Bioengineering

### Bio

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#### BIO

Michael Fischbach is an Associate Professor in the Department of Bioengineering at Stanford University, an institute scholar of Stanford ChEM-H, and the director of the Stanford Microbiome Therapies Initiative. Fischbach is a recipient of the NIH Director's Pioneer and New Innovator Awards, an HHMI-Simons Faculty Scholars Award, a Fellowship for Science and Engineering from the David and Lucille Packard Foundation, a Medical Research Award from the W.M. Keck Foundation, a Burroughs Wellcome Fund Investigators in the Pathogenesis of Infectious Disease award, and a Glenn Award for Research in Biological Mechanisms of Aging. His laboratory uses a combination of genomics and chemistry to identify and characterize small molecules from microbes, with an emphasis on the human microbiome. Fischbach received his Ph.D. as a John and Fannie Hertz Foundation Fellow in chemistry from Harvard in 2007, where he studied the role of iron acquisition in bacterial pathogenesis and the biosynthesis of antibiotics. After two years as an independent fellow at Massachusetts General Hospital, Fischbach joined the faculty at UCSF, where he founded his lab before moving to Stanford in 2017. Fischbach is a co-founder and director of Federation Bio, a co-founder of Revolution Medicines, and a member of the scientific advisory board of NGM Biopharmaceuticals.

#### ACADEMIC APPOINTMENTS

- Associate Professor, Bioengineering
- Member, Bio-X
- Faculty Fellow, Stanford ChEM-H

### Teaching

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#### COURSES

##### 2019-20

- Bioengineering Departmental Research Colloquium: BIOE 393 (Aut, Win)
- Systems Physiology and Design: BIOE 103 (Spr)
- Systems Physiology and Design: BIOE 103B (Spr)

##### 2018-19

- Problem choice and decision trees in science and engineering: BIOE 395 (Spr)
- Systems Physiology and Design: BIOE 103 (Spr)
- Systems Physiology and Design: BIOE 103B (Spr)

#### STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Kaisha Benjamin, Bryan Merrill

**Postdoctoral Faculty Sponsor**

Melhem Bilén, Yiyin Chen, Niokhor Dione, Nathan Johns, Daisy Lee, Kazuki Nagashima, Jakub Rajniak, Min Wang, Aishan Zhao

**Doctoral Dissertation Advisor (AC)**

Gabe Reder

**Master's Program Advisor**

Yucheng Huang

**Doctoral (Program)**

Nora Enright, Alexa Garcia

**Postdoctoral Research Mentor**

Edward Pham

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## Publications

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### PUBLICATIONS

- **Contextual control of skin immunity and inflammation by *Corynebacterium*.** *The Journal of experimental medicine*  
Ridaura, V. K., Bouladoux, N., Claesen, J., Chen, Y. E., Byrd, A. L., Constantinides, M. G., Merrill, E. D., Tamoutounour, S., Fischbach, M. A., Belkaid, Y.  
2018; 215 (3): 785–99
- **A Pressure Test to Make 10 Molecules in 90 Days: External Evaluation of Methods to Engineer Biology.** *Journal of the American Chemical Society*  
Casini, A., Chang, F. Y., Eluere, R., King, A. M., Young, E. M., Dudley, Q. M., Karim, A., Pratt, K., Bristol, C., Forget, A., Ghodasara, A., Warden-Rothman, R., Gan, et al  
2018
- **The Biosynthesis of Lipooligosaccharide from *Bacteroides thetaiotaomicron*.** *mBio*  
Jacobson, A. N., Choudhury, B. P., Fischbach, M. A.  
2018; 9 (2)
- **Skin microbiota-host interactions.** *Nature*  
Chen, Y. E., Fischbach, M. A., Belkaid, Y.  
2018; 553 (7689): 427–36
- **Discovery of Reactive Microbiota-Derived Metabolites that Inhibit Host Proteases** *CELL*  
Guo, C., Chang, F., Wyche, T. P., Backus, K. M., Acker, T. M., Funabashi, M., Taketani, M., Donia, M. S., Nayfach, S., Pollard, K. S., Craik, C. S., Cravatt, B. F., Clardy, et al  
2017; 168 (3): 517–?
- **A gut bacterial pathway metabolizes aromatic amino acids into nine circulating metabolites.** *Nature*  
Dodd, D., Spitzer, M. H., Van Treuren, W., Merrill, B. D., Hryckowian, A. J., Higginbottom, S. K., Le, A., Cowan, T. M., Nolan, G. P., Fischbach, M. A., Sonnenburg, J. L.  
2017; 551 (7682): 648–52
- **Modulation of a Circulating Uremic Solute via Rational Genetic Manipulation of the Gut Microbiota** *CELL HOST & MICROBE*  
Devlin, A. S., Marcobal, A., Dodd, D., Nayfach, S., Plummer, N., Meyer, T., Pollard, K. S., Sonnenburg, J. L., Fischbach, M. A.  
2016; 20 (6): 709–715
- **Signaling in Host-Associated Microbial Communities** *CELL*  
Fischbach, M. A., Segre, J. A.  
2016; 164 (6): 1288–1300
- **Synthetic biology to access and expand nature's chemical diversity** *NATURE REVIEWS MICROBIOLOGY*  
Smanski, M. J., Zhou, H., Claesen, J., Shen, B., Fischbach, M. A., Voigt, C. A.

2016; 14 (3): 135-149

- **A Wave of Regulatory T Cells into Neonatal Skin Mediates Tolerance to Commensal Microbes** *IMMUNITY*  
Scharschmidt, T. C., Vasquez, K. S., Truong, H., Gearty, S. V., Pauli, M. L., Nosbaum, A., Gratz, I. K., Otto, M., Moon, J. J., Liese, J., Abbas, A. K., Fischbach, M. A., Rosenblum, et al  
2015; 43 (5): 1011-1021
- **MetaQuery: a web server for rapid annotation and quantitative analysis of specific genes in the human gut microbiome** *BIOINFORMATICS*  
Nayfach, S., Fischbach, M. A., Pollard, K. S.  
2015; 31 (20): 3368-3370
- **Mammalian Lipopolysaccharide Receptors Incorporated into the Retroviral Envelope Augment Virus Transmission** *CELL HOST & MICROBE*  
Wilks, J., Lien, E., Jacobson, A. N., Fischbach, M. A., Qureshi, N., Chervonsky, A. V., Golovkina, T. V.  
2015; 18 (4): 456-462
- **Genome-Directed Lead Discovery: Biosynthesis, Structure Elucidation, and Biological Evaluation of Two Families of Polyene Macrolactams against *Trypanosoma brucei*** *ACS CHEMICAL BIOLOGY*  
Schulze, C. J., Donia, M. S., Siqueira-Neto, J. L., Ray, D., Raskatov, J. A., Green, R. E., McKerrow, J. H., Fischbach, M. A., Lington, R. G.  
2015; 10 (10): 2373-2381
- **Computational approaches to natural product discovery** *NATURE CHEMICAL BIOLOGY*  
Medema, M. H., Fischbach, M. A.  
2015; 11 (9): 639-648
- **A biosynthetic pathway for a prominent class of microbiota-derived bile acids** *NATURE CHEMICAL BIOLOGY*  
Devlin, A. S., Fischbach, M. A.  
2015; 11 (9): 685-?
- **A Phase-Variable Surface Layer from the Gut Symbiont *Bacteroides thetaiotaomicron*** *MBIO*  
Taketani, M., Donia, M. S., Jacobson, A. N., Lambris, J. D., Fischbach, M. A.  
2015; 6 (5)
- **Minimum Information about a Biosynthetic Gene cluster** *NATURE CHEMICAL BIOLOGY*  
Medema, M. H., Kottmann, R., Yilmaz, P., Cummings, M., Biggins, J. B., Blin, K., de Bruijn, I., Chooi, Y. H., Claesen, J., Coates, R. C., Cruz-Morales, P., Duddela, S., Duesterhus, et al  
2015; 11 (9): 625-631
- **HUMAN MICROBIOTA. Small molecules from the human microbiota.** *Science*  
Donia, M. S., Fischbach, M. A.  
2015; 349 (6246)
- **IMG-ABC: A Knowledge Base To Fuel Discovery of Biosynthetic Gene Clusters and Novel Secondary Metabolites** *MBIO*  
Hadjithomas, M., Chen, I. A., Chu, K., Ratner, A., Palaniappan, K., Szeto, E., Huang, J., Reddy, T. B., Cimermanic, P., Fischbach, M. A., Ivanova, N. N., Markowitz, V. M., Kyrpides, et al  
2015; 6 (4)
- **antiSMASH 3.0-a comprehensive resource for the genome mining of biosynthetic gene clusters** *NUCLEIC ACIDS RESEARCH*  
Weber, T., Blin, K., Duddela, S., Krug, D., Kim, H. U., Bruccoleri, R., Lee, S. Y., Fischbach, M. A., Mueller, R., Wohlleben, W., Breitling, R., Takano, E., Medema, et al  
2015; 43 (W1): W237-W243
- **Synthetic Microbes As Drug Delivery Systems** *ACS SYNTHETIC BIOLOGY*  
Claesen, J., Fischbach, M. A.  
2015; 4 (4): 358-364
- **A Systematic Computational Analysis of Biosynthetic Gene Cluster Evolution: Lessons for Engineering Biosynthesis** *PLOS COMPUTATIONAL BIOLOGY*  
Medema, M. H., Cimermanic, P., Sali, A., Takano, E., Fischbach, M. A.  
2014; 10 (12)
- **Discovery and Characterization of Gut Microbiota Decarboxylases that Can Produce the Neurotransmitter Tryptamine** *CELL HOST & MICROBE*

- Williams, B. B., Van Benschoten, A. H., Cimermancic, P., Donia, M. S., Zimmermann, M., Taketani, M., Ishihara, A., Kashyap, P. C., Fraser, J. S., Fischbach, M. A.  
2014; 16 (4): 495-503
- **A Systematic Analysis of Biosynthetic Gene Clusters in the Human Microbiome Reveals a Common Family of Antibiotics** *CELL*  
Donia, M. S., Cimermancic, P., Schulze, C. J., Brown, L. C., Martin, J., Mitreva, M., Clardy, J., Lington, R. G., Fischbach, M. A.  
2014; 158 (6): 1402-1414
  - **Insights into secondary metabolism from a global analysis of prokaryotic biosynthetic gene clusters.** *Cell*  
Cimermancic, P., Medema, M. H., Claesen, J., Kurita, K., Wieland Brown, L. C., Mavrommatis, K., Pati, A., Godfrey, P. A., Koehrsen, M., Clardy, J., Birren, B. W., Takano, E., Sali, et al  
2014; 158 (2): 412-421
  - **Propionibacterium-Produced Coproporphyrin III Induces Staphylococcus aureus Aggregation and Biofilm Formation** *MBIO*  
Wollenberg, M. S., Claesen, J., Escapa, I. F., Aldridge, K. L., Fischbach, M. A., Lemon, K. P.  
2014; 5 (4)
  - **Key applications of plant metabolic engineering.** *PLoS biology*  
Lau, W., Fischbach, M. A., Osbourn, A., Sattely, E. S.  
2014; 12 (6)
  - **Key applications of plant metabolic engineering.** *PLoS biology*  
Lau, W., Fischbach, M. A., Osbourn, A., Sattely, E. S.  
2014; 12 (6)
  - **The Prevalence of Species and Strains in the Human Microbiome: A Resource for Experimental Efforts** *PLOS ONE*  
Kraal, L., Abubucker, S., Kota, K., Fischbach, M. A., Mitreva, M.  
2014; 9 (5)
  - **Diet rapidly and reproducibly alters the human gut microbiome** *NATURE*  
David, L. A., Maurice, C. F., Carmody, R. N., Gootenberg, D. B., Button, J. E., Wolfe, B. E., Ling, A. V., Devlin, A. S., Varma, Y., Fischbach, M. A., Biddinger, S. B., Dutton, R. J., Turnbaugh, et al  
2014; 505 (7484): 559-?
  - **What Lives On Our Skin: Ecology, Genomics and Therapeutic Opportunities Of the Skin Microbiome.** *Drug discovery today. Disease mechanisms*  
Scharschmidt, T. C., Fischbach, M. A.  
2013; 10 (3-4)
  - **A metabolomic view of how the human gut microbiota impacts the host metabolome using humanized and gnotobiotic mice.** *ISME journal*  
Marcobal, A., Kashyap, P. C., Nelson, T. A., Aronov, P. A., Donia, M. S., Spormann, A., Fischbach, M. A., Sonnenburg, J. L.  
2013; 7 (10): 1933-1943
  - **Production of alpha-Galactosylceramide by a Prominent Member of the Human Gut Microbiota** *PLOS BIOLOGY*  
Brown, L. C., Penaranda, C., Kashyap, P. C., Williams, B. B., Clardy, J., Kronenberg, M., Sonnenburg, J. L., Comstock, L. E., Bluestone, J. A., Fischbach, M. A.  
2013; 11 (7)
  - **antiSMASH 2.0--a versatile platform for genome mining of secondary metabolite producers.** *Nucleic acids research*  
Blin, K., Medema, M. H., Kazempour, D., Fischbach, M. A., Breitling, R., Takano, E., Weber, T.  
2013; 41 (Web Server issue): W204-12
  - **Production of a-galactosylceramide by a prominent member of the human gut microbiota.** *PLoS biology*  
Wieland Brown, L. C., Penaranda, C., Kashyap, P. C., Williams, B. B., Clardy, J., Kronenberg, M., Sonnenburg, J. L., Comstock, L. E., Bluestone, J. A., Fischbach, M. A.  
2013; 11 (7)
  - **Cell-Based Therapeutics: The Next Pillar of Medicine** *SCIENCE TRANSLATIONAL MEDICINE*  
Fischbach, M. A., Bluestone, J. A., Lim, W. A.  
2013; 5 (179)
  - **Trehalose Biosynthesis Promotes Pseudomonas aeruginosa Pathogenicity in Plants** *PLOS PATHOGENS*

- Djonovic, S., Urbach, J. M., Drenkard, E., Bush, J., Feinbaum, R., Ausubel, J. L., Traficante, D., Risech, M., Kocks, C., Fischbach, M. A., Priebe, G. P., Ausubel, F. M.  
2013; 9 (3)
- **Dyeing to Learn More about the Gut Microbiota** *CELL HOST & MICROBE*  
Donia, M. S., Fischbach, M. A.  
2013; 13 (2): 119-120
  - **Ribosomally synthesized and post-translationally modified peptide natural products: overview and recommendations for a universal nomenclature.** *Natural product reports*  
Arnison, P. G., Bibb, M. J., Bierbaum, G., Bowers, A. A., Bugni, T. S., Bulaj, G., Camarero, J. A., Campopiano, D. J., Challis, G. L., Clardy, J., Cotter, P. D., Craik, D. J., Dawson, et al  
2013; 30 (1): 108-160
  - **Molecular Analysis of Model Gut Microbiotas by Imaging Mass Spectrometry and Nanodesorption Electrospray Ionization Reveals Dietary Metabolite Transformations** *ANALYTICAL CHEMISTRY*  
Rath, C. M., Alexandrov, T., Higginbottom, S. K., Song, J., Milla, M. E., Fischbach, M. A., Sonnenburg, J. L., Dorrestein, P. C.  
2012; 84 (21): 9259-9267
  - **Molecular Insights into the Biosynthesis of Guadinomine: A Type III Secretion System Inhibitor** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*  
Holmes, T. C., May, A. E., Zaleta-Riyera, K., Ruby, J. G., Skewes-Cox, P., Fischbach, M. A., DeRisi, J. L., Iwatsuki, M., Omura, S., Khosla, C.  
2012; 134 (42): 17797-17806
  - **Microbiota-Targeted Therapies: An Ecological Perspective** *SCIENCE TRANSLATIONAL MEDICINE*  
Lemon, K. P., Armitage, G. C., Relman, D. A., Fischbach, M. A.  
2012; 4 (137)
  - **A mass spectrometry-guided genome mining approach for natural product peptidogenomics** *NATURE CHEMICAL BIOLOGY*  
Kersten, R. D., Yang, Y., Xu, Y., Cimermancic, P., Nam, S., Fenical, W., Fischbach, M. A., Moore, B. S., Dorrestein, P. C.  
2011; 7 (11): 794-802
  - **Eating For Two: How Metabolism Establishes Interspecies Interactions in the Gut** *CELL HOST & MICROBE*  
Fischbach, M. A., Sonnenburg, J. L.  
2011; 10 (4): 336-347
  - **Combination therapies for combating antimicrobial resistance** *CURRENT OPINION IN MICROBIOLOGY*  
Fischbach, M. A.  
2011; 14 (5): 519-523
  - **antiSMASH: rapid identification, annotation and analysis of secondary metabolite biosynthesis gene clusters in bacterial and fungal genome sequences** *NUCLEIC ACIDS RESEARCH*  
Medema, M. H., Blin, K., Cimermancic, P., de Jager, V., Zakrzewski, P., Fischbach, M. A., Weber, T., Takano, E., Breitling, R.  
2011; 39: W339-W346
  - **Community Health Care: Therapeutic Opportunities in the Human Microbiome** *SCIENCE TRANSLATIONAL MEDICINE*  
Sonnenburg, J. L., Fischbach, M. A.  
2011; 3 (78)
  - **Draft Genome Sequence of *Streptomyces clavuligerus* NRRL 3585, a Producer of Diverse Secondary Metabolites** *JOURNAL OF BACTERIOLOGY*  
Song, J. Y., Jeong, H., Yu, D. S., Fischbach, M. A., Park, H., Kim, J. J., Seo, J., Jensen, S. E., Oh, T. K., Lee, K. J., Kim, J. F.  
2010; 192 (23): 6317-6318
  - **A Family of Pyrazinone Natural Products from a Conserved Nonribosomal Peptide Synthetase in *Staphylococcus aureus*** *CHEMISTRY & BIOLOGY*  
Zimmermann, M., Fischbach, M. A.  
2010; 17 (9): 925-930
  - **A Chromatin-Mediated Reversible Drug-Tolerant State in Cancer Cell Subpopulations** *CELL*  
Sharma, S. V., Lee, D. Y., Li, B., Quinlan, M. P., Takahashi, F., Maheswaran, S., McDermott, U., Azizian, N., Zou, L., Fischbach, M. A., Wong, K., Brandstetter, K., Wittner, et al  
2010; 141 (1): 69-80

- **Natural Products Version 2.0: Connecting Genes to Molecules** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*  
Walsh, C. T., Fischbach, M. A.  
2010; 132 (8): 2469-2493
- **Dapdiamides, Tripeptide Antibiotics Formed by Unconventional Amide Ligases** *JOURNAL OF NATURAL PRODUCTS*  
Dawlaty, J., Zhang, X., Fischbach, M. A., Clardy, J.  
2010; 73 (3): 441-446
- **The next frontier of systems biology: higher-order and interspecies interactions** *GENOME BIOLOGY*  
Fischbach, M. A., Krogan, N. J.  
2010; 11 (5)
- **Antibiotics from microbes: converging to kill** *CURRENT OPINION IN MICROBIOLOGY*  
Fischbach, M. A.  
2009; 12 (5): 520-527
- **Genome sequence and analysis of the Irish potato famine pathogen *Phytophthora infestans*** *NATURE*  
Haas, B. J., Kamoun, S., Zody, M. C., Jiang, R. H., Handsaker, R. E., Cano, L. M., Grabherr, M., Kodira, C. D., Raffaele, S., Torto-Alalibo, T., Bozkurt, T. O., Ah-Fong, A. M., Alvarado, et al  
2009; 461 (7262): 393-398
- **Antibiotics for Emerging Pathogens** *SCIENCE*  
Fischbach, M. A., Walsh, C. T.  
2009; 325 (5944): 1089-1093
- **New Ways to Squash Superbugs** *SCIENTIFIC AMERICAN*  
Walsh, C. T., Fischbach, M. A.  
2009; 301 (1): 44-51
- **The natural history of antibiotics** *CURRENT BIOLOGY*  
Clardy, J., Fischbach, M. A., Currie, C. R.  
2009; 19 (11): R437-R441
- **Thirteen posttranslational modifications convert a 14-residue peptide into the antibiotic thiocillin** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*  
Brown, L. C., Acker, M. G., Clardy, J., Walsh, C. T., Fischbach, M. A.  
2009; 106 (8): 2549-2553
- **Repurposing libraries of eukaryotic protein kinase inhibitors for antibiotic discovery** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*  
Walsh, C. T., Fischbach, M. A.  
2009; 106 (6): 1689-1690
- **Structurally diverse natural products that cause potassium leakage trigger multicellularity in *Bacillus subtilis*** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*  
Lopez, D., Fischbach, M. A., Chu, F., Losick, R., Kolter, R.  
2009; 106 (1): 280-285
- **Total biosynthesis: in vitro reconstitution of polyketide and nonribosomal peptide pathways** *NATURAL PRODUCT REPORTS*  
Sattely, E. S., Fischbach, M. A., Walsh, C. T.  
2008; 25 (4): 757-793
- **Insights from the complete genome sequence of *Mycobacterium marinum* on the evolution of *Mycobacterium tuberculosis*** *GENOME RESEARCH*  
Stinear, T. P., Seemann, T., Harrison, P. F., Jenkin, G. A., Davies, J. K., Johnson, P. D., Abdallah, Z., Arrowsmith, C., Chillingworth, T., Churcher, C., Clarke, K., Cronin, A., Davis, et al  
2008; 18 (5): 729-741
- **The evolution of gene collectives: How natural selection drives chemical innovation** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*  
Fischbach, M. A., Walsh, C. T., Clardy, J.

2008; 105 (12): 4601-4608

- **Inhibitors of sterol biosynthesis as Staphylococcus aureus antibiotics** *ANGEWANDTE CHEMIE-INTERNATIONAL EDITION*  
Walsh, C. T., Fischbach, M. A.  
2008; 47 (31): 5700-5702
- **Biosynthetic tailoring of microcin e492m: Post-translational modification affords an antibacterial siderophore-peptide conjugate** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*  
Nolan, E. M., Fischbach, M. A., Koglin, A., Walsh, C. T.  
2007; 129 (46): 14336-14347
- **Directed evolution can rapidly improve the activity of chimeric assembly-line enzymes** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*  
Fischbach, M. A., Lai, J. R., Roche, E. D., Walsh, C. T., Liu, D. R.  
2007; 104 (29): 11951-11956
- **One pathway, many products** *NATURE CHEMICAL BIOLOGY*  
Fischbach, M. A., Clardy, J.  
2007; 3 (7): 353-355
- **The identification of bacillaene, the product of the PksX megacomplex in Bacillus subtilis** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*  
Butcher, R. A., Schroeder, F. C., Fischbach, M. A., Straight, P. D., Kolter, R., Walsh, C. T., Clardy, J.  
2007; 104 (5): 1506-1509
- **A singular enzymatic megacomplex from Bacillus subtilis** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*  
Straight, P. D., Fischbach, M. A., Walsh, C. T., Rudner, D. Z., Kolter, R.  
2007; 104 (1): 305-310
- **New antibiotics from bacterial natural products** *NATURE BIOTECHNOLOGY*  
Clardy, J., Fischbach, M. A., Walsh, C. T.  
2006; 24 (12): 1541-1550
- **The pathogen-associated iroA gene cluster mediates bacterial evasion of lipocalin 2** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*  
Fischbach, M. A., Lin, H., Zhou, L., Yu, Y., Abergel, R. J., Liu, D. R., Raymond, K. N., Wanner, B. L., Strong, R. K., Walsh, C. T., Aderem, A., Smith, K. D.  
2006; 103 (44): 16502-16507
- **Biochemistry - Directing biosynthesis** *SCIENCE*  
Fischbach, M. A., Walsh, C. T.  
2006; 314 (5799): 603-605
- **Localized protein interaction surfaces on the EntB carrier protein revealed by combinatorial mutagenesis and selection** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*  
Lai, J. R., Fischbach, M. A., Liu, D. R., Walsh, C. T.  
2006; 128 (34): 11002-11003
- **Structural characterization of enterobactin hydrolase IroE** *BIOCHEMISTRY*  
Larsen, N. A., Lin, H., Wei, R., Fischbach, M. A., Walsh, C. T.  
2006; 45 (34): 10184-10190
- **A biosynthetic gene cluster for the acetyl-CoA carboxylase inhibitor andrimid** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*  
Jin, M., Fischbach, M. A., Clardy, J.  
2006; 128 (33): 10660-10661
- **Assembly-line enzymology for polyketide and nonribosomal peptide antibiotics: Logic, machinery, and mechanisms** *CHEMICAL REVIEWS*  
Fischbach, M. A., Walsh, C. T.  
2006; 106 (8): 3468-3496
- **Bromoenterobactins as potent inhibitors of a pathogen-associated, siderophore-modifying C-glycosyltransferase** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*

- Lin, H., Fischbach, M. A., Gatto, G. J., Liu, D. R., Walsh, C. T.  
2006; 128 (29): 9324-9325
- **"Oncogenic shock": Explaining oncogene addiction through differential signal attenuation** *CLINICAL CANCER RESEARCH*  
Sharma, S. V., Fischbach, M. A., Haber, D. A., Settleman, J.  
2006; 12 (14): 4392S-4395S
  - **A protein interaction surface in nonribosomal peptide synthesis mapped by combinatorial mutagenesis and selection** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*  
Lai, J. R., Fischbach, M. A., Liu, D. R., Walsh, C. T.  
2006; 103 (14): 5314-5319
  - **How pathogenic bacteria evade mammalian sabotage in the battle for iron** *NATURE CHEMICAL BIOLOGY*  
Fischbach, M. A., Lin, H. N., Liu, D. R., Walsh, C. T.  
2006; 2 (3): 132-138
  - **Activity screening of carrier domains within nonribosomal peptide synthetases using complex substrate mixtures and large molecule mass spectrometry** *BIOCHEMISTRY*  
Dorrestein, P. C., Blackhall, J., Straight, P. D., Fischbach, M. A., Garneau-Tsodikova, S., Edwards, D. J., McLaughlin, S., Lin, M., Gerwick, W. H., Kolter, R., Walsh, C. T., Kelleher, N. L.  
2006; 45 (6): 1537-1546
  - **Mixing with bubbles: a practical technology for use with portable microfluidic devices** *LAB ON A CHIP*  
Garstecki, P., Fuerstman, M. J., Fischbach, M. A., Sia, S. K., Whitesides, G. M.  
2006; 6 (2): 207-212
  - **Enzymatic tailoring of enterobactin alters membrane partitioning and iron acquisition** *ACS CHEMICAL BIOLOGY*  
Luo, M., Lin, H., Fischbach, M. A., Liu, D. R., Walsh, C. T., Groves, J. T.  
2006; 1 (1): 29-32
  - **Regulation of the nucleotide state of oncogenic Ras proteins by nucleoside diphosphate kinase** *REGULATORS AND EFFECTORS OF SMALL GTPASES: RAS FAMILY*  
Fischbach, M. A., Settleman, J.  
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