Harris H. Wang

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CITIZENSHIP United States of America

FIELD Systems and synthetic biology; Microbiome, Genome engineering; Microbial communities; Evolutionary biology; Functional genomics

EDUCATION

2010 ***Harvard University***
Ph.D. in Biophysics

2010 ***Harvard-MIT Health Sciences and Technology***
Joint-Ph.D. in Medical Engineering Medical Physics (MEMP)

2005 ***Massachusetts Institute of Technology***
B.S. in Physics, B.S. in Applied Mathematics, minor in Biomedical Engineering

PROFESSIONAL EXPERIENCE

3/2013 – present Assistant Professor of Systems Biology
Department of Systems Biology
Department of Pathology & Cell Biology
Columbia University, College of Physicians and Surgeons, New York, USA

2010 – 2013 Wyss Technology Development Fellow (PI status)
Instructor, Department of Systems Biology, Harvard Medical School
Wyss Institute for Biologically Inspired Engineering, Harvard University.
Faculty mentors: Jim J. Collins (BU), George M. Church, Don E. Ingber (HMS)
Projects: Functional metagenomic reprogramming of the human microbiome;
Engineered cooperativity in synthetic ecosystems.

2005 – 2010 NSF Graduate Research Fellowship
NDSEG Graduate Research Fellowship
Department of Genetics, Harvard Medical School, Boston, MA
Ph.D. thesis advisor: George M Church
Thesis committee: Jack Szostak (HMS), Jon Beckwith (HMS), David Liu (Harvard). Ron Weiss (MIT), Jim Hogle (HMS)
Ph.D. thesis title: "Multiplex Automated Genome Engineering (MAGE) for the Optimization of Metabolic Pathways, Construction of New Genetic Codes, and Evolution of Synthetic Organisms."

2008 Medical Clerkship, Mount Auburn Hospital, Cambridge, MA
Advisor: Dr. Valerie Pronio-Stelluto
Description: 3 month internal medicine rotation through HST MEMP

PUBLICATIONS

** denote shared first authorship, ¥ denote co-corresponding authorship*

38. Johns NI, Gomes ALC, Yim SS, Yang A, Blazejewski T, Smillie CS, Smith MB, Alm EJ, Kosuri S, Wang HH. Metagenomic mining of regulatory elements enables programmable species-selective gene expression. ***Nature Methods*** doi:10.1038/nmeth.4633 (2018).
37. Park J, Wang HH. Systematic and synthetic approaches to rewire regulatory networks. ***Curr Opin Syst Biol*** 8:90–96 (2018).
36. Sheth RU, Yim SS, Wu FL, Wang HH. Multiplex recording of cellular events over time into a CRISPR biological tape. ***Science*** 358:1457–1461 (2017).
35. Kelsic ED, Chung H, Cohen N, Park J, Wang HH¥, Kishony R¥. Optimal codon choice throughout a gene. ***Cell Systems*** 3(6):563–571 (2016).
34. Stockman VB, Ghamsari L, Cabrera GL, Honig B, Shapira SD, Wang HH. A high-throughput strategy for dissecting mammalian genetic interactions. ***PLoS One*** 11(12):e0167617 (2016).
33. Boeke JD, Church GM, Hessel A, Kelly NJ, … Wang HH, et al. The Genome Project-Write. ***Science***. DOI: 10.1126/science.aaf6850 (2016).
32. Gomes ALC, Wang HH. The role of genome accessibility in transcription factor binding in bacteria. ***PLoS Comput Biol*** doi:10.1371/journal.pcbi.1004891 (2016). PMID: 27104615
31. Utrilla J, O'Brien EJ, Chen K, McCloskey D, Cheung J, Wang HH, Armenta-Medina D, Feist AM, Palsson BO**.** Global rebalancing of cellular resources by pleiotropic point mutations illustrates a multi-scale mechanism of adaptive evolution. ***Cell Systems*** 2:260-271 (2016). PMID: 27135538
30. Johns NI, Tomasz Blazejewski T, Gomes ALC, Wang HH. Principles for designing synthetic microbial communities. ***Curr Opin Microbiol*** 31:146–153 (2016). PMID: 27084981
29. Widder S, Allen RJ, Pfeiffer T, Curtis TP, … Wang HH, et al., Challenges in microbial ecology: building predictive understanding of community function and dynamics. ***The ISME Journal*** doi: 10.1038/ismej.2016.45 (2016). PMID: 27022995
28. Sheth RU, Cabral V, Chen SP, Wang HH. Manipulating bacterial communities by in situ microbiome engineering. ***Trends in Genetics.*** 32:189-200, (2016).
27. Tasoff J, Mee MT, Wang HH. An economic framework of microbial trade. ***PLoS One*** 10(7):e0132907. DOI: 10.1371/journal.pone.0132907 (2015). PMID: 26222307.
26. Freedberg DE, Toussaint NC, Chen SP, Ratner AJ, Susan Whittier S, Wang TC, Wang HH¥, Abrams JA¥. Proton pump inhibitors alter specific taxa in the human fecal microbiome: results of a crossover trial. ***Gastroenterology*** 149:883-5 (2015). PMID: 26164495.
25. Yaung SJ, Deng L, Li N, Braff JL, Liu Q, Church GM, Bry L, Wang HH¥, Gerber GK¥. Improving microbial fitness in the mammalian gut by in vivo temporal functional metagenomics. ***Mol Sys Biol*** 11:788 (2015). PMID: 26148351.
24. Munck C, Gumpert HK, Nilsson AI, Wang HH, Sommer MOA. Resistance development against drug combinations is predicted by the evolutionary responses to the component drugs. ***Sci Transl Med*** 262:262ra156 (2014). PMID: 25391482.
23. Orena Y, Smith MB, Johns NI, Zeevia MK, Birand D, Rond EZ, Coranderf J, Wang HH, Alm EJ, Pupko T. Transfer of noncoding DNA drives regulatory rewiring in bacteria. ***Proc Natl Acad Sci USA***. 111(45):16112-17 (2014). PMID: 25313052.
22. Mee MT, Collins JJ, Church GM, Wang HH. Syntrophic exchange in synthetic microbial communities. ***Proc Natl Acad Sci USA*** 111(20): E2149-56 (2014). PMID: 24778240.
21. Bonde MT, Kosuri S, Genee HJ, Sarup-Lytzen K, Church GM, Sommer MOA, Wang HH. Direct mutagenesis of thousands of genomic targets using microarray-derived oligonucleotides. ***ACS Synth Biol*** 4(1):17-22 (2014). PMID: 24856730.
20. Bonde MT, Klausen MS, Anderson MV, Wallin AIN, Wang HH¥, Sommer MOA¥. MODEST: A web-based design tool for oligonucleotide-mediated genome engineering and

recombineering. ***Nucleic Acids Res.*** W408-15. doi:10.1021/sb5001565 (2014) PMID: 24838561.

19. Yaung S, Wang HH. "Recent progress in engineering human-associated microbiomes." in Engineering and Analyzing Multicellular Systems, ***Methods Mol Biol*** 1151:3-25 (2014). PMID: 24838875.
18. Esvelt K, Wang HH. Genome-scale engineering for systems and synthetic biology. ***Mol Sys Biol*** 9:641, (2013) PMID: 23340847.
17. DiCarlo JE, Conley AJ, Penttilä M, Jäntti J, Wang HH¥, Church GM, Yeast Oligo-mediated Genome Engineering (YOGE), ***ACS Synth Biol*** 2(12):741-9. (2013) PMID: 24160921.
16. Wang HH, Mee MT, Church GM. "Applications of Engineered Synthetic Ecosystems" in Synthetic Biology: Tools and Applications. Editor: Huimin Zhao, Elsevier, p. 317-325. (2013).
15. Lajoie MJ, Rovner AJ, Goodman DB, Aerni H, Mercer JA, Wang HH, Carr PA, Schultz PG, Jacobson JM, Rinehart J, Church GM, Isaacs FJ. Genomically Recoded Organisms Impart New Biological Functions. ***Science*** 342(6156):357-60 (2013). PMID: 24136966.
14. Mosberg JA, Gregg CJ, Lajoie MJ, Wang HH, Church GM. Improving Lambda Red Genome Engineering via Rational Removal of Endogenous Nucleases. ***PLoS One*** 7(9): e44638. doi:10.1371/journal.pone.0044638, (2012). PMID: 22957093.
13. Mee M, Wang HH. Engineering ecosystems and synthetic ecologies. ***Mol Biosys*** 8(10):2470-83 (2012). PMID: 22722235.
12. Wang HH*, Kim HB*, Cong L, Jeong JH, Bang D, Church GM. *Genome-scale Promoter Engineering by Co-Selection MAGE.* ***Nature Methods*** **9**: 591-3 (2012). PMID: 22484848.
11. Carr PA*, Wang HH*, Sterling B*, Isaacs FJ, Xu G, Kraal L, Bang D, Jacobson J, Church GM. *Enhanced Multiplex Genome Engineering through Cooperative Oligonucleotide Co-selection.* ***Nucleic Acids Res*** 40(17):e132. DOI: 10.1093/nar/gks455, (2012). PMID: 22638574.
10. Wang HH*, Huang P*, Xu G, Marbelstone A, Li J, Forster T, Jewett MC, Church GM. Multiplexed in vivo tagging of enzyme ensembles with MAGE for in vitro single-pot multi-enzyme catalysis. ***ACS Synth Biol*** *1*:43−52 (2012). PMID: 22737598.
9. Isaacs FJ*, Carr PA*, Wang HH*, Lajoie MJ, Sterling B, Kraal L, Tolonen AC, Gianoulis TA, Goodman DB, Reppas NB, Emig CJ, Bang D, Hwang SJ, Jewett MC, Jacobson JM, Church GM. Precise manipulation of chromosomes in vivo enables genome-wide codon replacement. ***Science*** 333: 348-53 (2011). PMID: 21764749.
8. Wang HH, Xu G, Vonner AJ, Church G. Modified bases enable high-efficiency oligonucleotide-mediated allelic replacement via mismatch repair evasion. ***Nucleic Acids Res*** 39(16): 7336-47 (2011). PMID: 21609953.
7. Wang HH, Church GM. Multiplexed genome engineering and genotyping methods applications for synthetic biology and metabolic engineering. ***Method Enzymol*** 498:409-26 (2011). PMID: 21601688.
6. Wang HH. *Synthetic Genomes for Synthetic Biology.* ***J Mol Cell Biol*** **2**(4): 178-179, (2010).
5. Wang HH*, Isaacs FJ*, Carr PA, Sun ZZ, Xu G, Forest CR, Church GM. Programming cells by multiplex genome engineering and accelerated evolution. ***Nature*** 460: 894-8, (2009). PMID: 19633652.
4. Wang HH, Menezes NM, Zhu MW, Ay H, Koroshetz WJ, Aronen HJ, Karonen JO, Liu Y, Nuutinen J, Wald LL, Sorensen AG. *Physiological noise in MR images: an indicator of the tissue response to ischemia?* ***J Magn Reson Imaging*** 27(4): 866-71 (2008). PMID: 18383248.
3. Wang HH, Wang XF. "Analytical methods of atherosclerosis research." in *Current Development in Atherosclerosis Research*, 33-66, Nova Science Publishing, NY (2006).
2. Wang HH, Wang XF. "Modeling atherosclerosis." in *Trends in Atherosclerosis Research*, 279-311, Nova Science Publishing, NY, (2004).

1. Wang HH. *Analytical model of atherosclerosis.* ***Atherosclerosis*** **159**: 1-7 (2001). PMID: 11689200

INVITED TALKS

- *"Recording Biological Surroundings from Within"* NAS Workshop: The Promise of Genome Editing Tools to Advance Environmental Health Research, Washington DC, USA (Jan 2018)
- *"Engineering microbial communities and the mammalian gut microbiome"* 12th International Conference on Genomics (ICG12), Shenzhen, China (Oct 2017)
- *"Engineering microbial communities and the mammalian gut microbiome"* Sino-US Chinese Conference on Synthetic Biology (SUCC2017), Hangzhou, China (Oct 2017)
- *"Spatiotemporal metagenomics of the mammalian gut"* The Human Microbiome – Emerging Themes at the Horizon of the 21st Century, NIH Workshop, Bethesda, MD, USA (August 2017)
- *"Engineering the mammalian gut microbiome in situ"* SEED, Vancouver, Canada (June 2017)
- "*Spatial metagenomics: mapping microbial biogeography at micron-scale resolution to dissect interspecies interactions*" ASM Microbe, New Orleans, LA, USA (June 2017)
- "*Engineering the Microbiome & Mammalian Genome with Enhanced Metabolic Functions*" GP-write Meeting 2017, NY Genome Center, NY, USA (May 2017)
- "*Spatial metagenomics to map microbial biogeography in the gut*" NIAID/DMID Workshop Single Cell Technologies for Infectious Diseases, Rockville, MD, USA (April 2017)
- "*Synthetic and Systems Biology Approaches to Study and Manipulate Horizontal Gene Flow*" NYBIG 2016, Keynote, NYU, NY, USA (May 2016)
- "*Mammalian synthetic biology through engineering the human microbiome*" Human Genome Project-Write Workshop, Harvard Medical School, MA, USA (May 2016)
- "*Synthesizing a Prototrophic Human Genome*" Human Genome Project-Write Workshop, Harvard Medical School, MA, USA (May 2016)
- "*Combinatorial CRISPR Screens*" Columbia University CRISPR Workshop, Columbia University, NY, USA (Nov 2015)
- "*Genome-scale Engineering of Microbial Cells and Communities*" Penn Bioinformatics Forum Seminar Series, University of Pennsylvania, Philadelphia, USA. (November 2015)
- *"Genome-scale Engineering of Microbial Cells and Communities*" BioTechnology Institute Seminar Series, University of Minnesota, MN, USA (Oct 2015)
- "*Genome-scale Engineering of Microbial Cells and Communities*" 7th Copenhagen Bioscience Conferences on Cell factories and Biosustainability, Copenhagen, Denmark (June 2015)
- "*Engineering the Human Microbiome with Synthetic Biology*" Genspace Seminar Series, Brookline, NY, USA (May 2015)
- "*Microbial Genome Engineering of Cells and Communities*" Horizons Seminar Series, Dupont USA, Wilmington, DE, USA (December 2014)
- "*Engineering Metabolic Exchange in Synthetic Microbial Communities*" Understanding Microbial Communities Workshop, Isaac Newton Institute, Cambridge, UK (November 2014)
- "*Massively Parallel Mutagenesis and Genome Engineering using Oligonucleotide Libraries*" Synthetic Biology Engineering, Evolution, and Design Conference, California, USA (July 2014)
- "*Syntrophic Exchange in Synthetic Microbial Communities*" 1st ASM Conference on Experimental Microbial Evolution, Washington DC, USA (June 2014)
- "*Multiplex Genome-scale Engineering" National Academies of Science. Industrialization of Biology*, Washington DC, USA (May 2014)

- "Multiplex Genome Engineering to Reprogram the Human Microbiome" Weill Cornell Institute for Computational Biomedicine (ICB) Seminar. New York, USA (Feb 2014)
- "Programming Cells and Microbial Communities by Multiplexed Genome Engineering" Towards Next Generation Synthetic Biology Workshop, Warwick Centre for Integrative Synthetic Biology (WISB), University of Warwick, Coventry, UK. (Nov 2013)
- "Metagenomic Synthetic Biology Systems for Microbiome Engineering" 2013 Frontiers in Mucosal Immunology Symposium, Boston, USA. (Oct 2013)
- "*Multiplexed Genome Engineering: methods and applications*" Cold Spring Harbor Synthetic Biology Course, Cold Spring, NY, USA (Aug 2013)
- "*Engineered Cooperativity in Synthetic Ecosystems*" Cold Spring Harbor Asia, Suzhou, China (Nov 2011)
- "*Construction of Synthetic Organisms through Large-scale Genome Engineering*" 33rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Boston, MA, USA (Sept 2011)
- "*Recoding Genomes for Synthetic and Orthogonal Biology*" 2011 International Union of Microbiological Societies, Sapporo, Japan (Sept 2011)
- "*Implications of Engineered Biological Chassis on Safety and Security*" Workshop on Genome Engineering, Defense Threat Reduction Agency (DTRA), Springfield, VA, USA (2010 Oct)
- "*Whole Genome Construction by Multiplexed Engineering and Automation*" Bio International Convention, Chicago, IL, USA (2010 May)
- "*Fast-pace Genome Engineering of Synthetic Organisms*" 17th Annual Microbial Genomics Conference, Rocky Gap, MD, USA (2009 Oct)
- Wang, HH. "*Engineering, Evolving, and Editing Genomes for Bioenergy Applications*" Joint Bioenergy Institute, UC-Berkeley, Berkeley, CA, USA (2009 Sept)
- "*Synthetic biology, accelerated evolution, and exploring diversity in biological systems*." (Keynote) IEEE Congress on Evolutionary Computation, Trondheim, Norway (2009 May)
- "*Synthetic biology, accelerated evolution, and exploring diversity in biological systems*." BBN Technologies, Boston, MA, USA (2009 April)

PATENT APPLICATIONS

- *Multiplex Automated Genome Engineering*. Church GM, Wang HH, Isaacs FJ. WO2008/052101A2
- *Improving microbial fitness in the mammalian gut.* Wang HH. *PCT/US No.: 14/66173*
- *A High-throughput Strategy for Combinatorial Targeting of CRISPR/Cas9 to Multiple Genetic Loci.* Wang HH, Shapira SS, Stockman, V. PCT/US No.: 15/747,677
- *Microbial Fingerprinting for Real-time Microbiome Surveillance.* Wang HH, Sheth RU. PCT/US No.: 62/475,608.
- *Spatial Metagenomics to Map Microbial Biogeography in the Gut.* Wang HH, Sheth RU. PCT/US No.:62/486,244
- *In situ Microbiome Engineering through Engineered Mobile Genetic Elements.* Wang HH. PCT/US No.: 62/465,522
- *CRISPR-based Methods for Recording Biological Signals.* Wang HH, Sheth RU. (Provisional).
- *Novel Nano-piercing Transformation Method for Gut Bacteria*. Wang HH. (Provisional).
- *CRISPR-based Methods for Altering Prokaryotic Genes and Altering the Gut Microbiome.* Wang HH (Provisional).

AWARDS AND RECOGNITIONS

2018 Schaefer Research Scholar, Columbia University
2017 Dr. Harold & Golden Lamport Research Award in Basic Sciences, Columbia University
2017 Burroughs Wellcome Fund, Investigator in Pathogenesis of Infectious Disease (PATH)
2017 Presidential Early Career Award for Scientists and Engineers (PECASE)
2017 ONR Director of Research Early Career Award
2015 ONR Young Investigator
2015 Sloan Research Fellowship
2015 Gen9 G-Prize
2014 NSF CAREER Award
2012 Forbes 30 under 30 in Science
2011 NIH Director's Early Independence Award
2011 Wyss Technology Development Fellowship
2009 Collegiate Inventors Competition Grand Prize Winner, National Inventors Hall of Fame
2009 Certificate of Distinction in Teaching, Derek Bok Center, Harvard University
2008 National Science Foundation Graduate Fellowship
2006 National Defense Science and Engineering Graduate Fellowship
2002 Exceptional Summer Student at NINDS
2001 National Merit Scholar

PROFESSIONAL MEMBERSHIP

American Society of Microbiology
American Chemical Society
American Association for the Advancement of Science

PROFESSIONAL & COMMUNITY SERVICE ACTIVITIES

- Journal reviewer for *Nature, Nature Biotechnology*, *Nature Methods*, *Nature Communications*, *Cell Systems*, *BMC Systems Biology*, *Nucleic Acids Research*, *ACS Synthetic Biology*, *Molecular Systems Biology, PLoS Computational Biology, Biotechnology Journal*.
- Grant reviewer for NIH, ARO, DOE (JGI), NSF, NUS (Singapore).
- Visiting Fellow at the Isaac Newton Institute for Mathematical Science on Program on Understanding Microbial Communities (Cambridge, UK, 2014).
- Development of a Synthetic Biology course for public education with Genspace, a pioneer Do-It-Yourself Biology organization in Brooklyn, NY (2014-2016).
- Organizer of International Genetically Engineered Machines (iGEM) teams at Harvard University and Columbia University (2007, 2015-2017).
- Organizer of Student Leadership Council for the NSF Synthetic Biology Engineering Research Center (Boston, USA, 2006-2010).
- Participant of Congressional Visit Day (CVD) to advocate increasing science funding in both House of Representatives and Senate chambers (Washington DC, USA, 2006).

TEACHING EXPERIENCE

2017 Fall *Lecturer, Columbia University Medical Center*
Course: Molecular Genetics (G level) [Cell Biology G4150x]
2017 Spring *Lecturer, Columbia University SEAS*
Course: *Intro to Synthetic Biology* [BMEN E4520x]
2017 Summer *Lecturer, Cold Spring Harbor Laboratories*
Course: Synthetic Biology Summer Course

2016 Summer *Lecturer, Weill Cornell Medical School*
Course: *ACLS International Summer School*
2016 Summer *Course organizer and instructor, Cold Spring Harbor Laboratories*
Course: Synthetic Biology Summer Course
Instructor: Harris Wang, Vincent Noireaux, Mary Dunlop, Mo Khalil, Chase Biesel
2015 Fall *Lecturer, Columbia University Medical Center*
Course: Molecular Genetics (G level) [Cell Biology G4150x]
2014 Fall *Lecturer, Columbia University Medical Center*
Course: Molecular Genetics (G level) [Cell Biology G4150x]
2013 Summer *Lecturer, Cold Spring Harbor Laboratories*
Course: Synthetic Biology Summer Course
Instructor: Jeff Tabor, Julius Lucks, David Savage, Karmella Haynes
2009 Fall *Teaching Fellow, Harvard University*
(Awarded Certificate of Distinction in Teaching)
Course: Biophysics 101 Genomics, Computing, and Economics (U/G level)
Instructor: George Church, Department of Genetics, Harvard Medical School

GRADUATE STUDENTS THESIS COMMITTEE

- Sean Llewellyn (MD/PhD), Advisor: J. Faith, thesis committee (MSSM, outside reviewer)
- Nicholas Hornstein (MD/PhD), Advisor: P. Sims, thesis committee
- Andy Yao Zong Ng (Chemistry), Advisor: V. Cornish, thesis & qualifying exam committee
- Jamie Yang (MD/PhD), Advisor: S. Tavazoie, qualifying exam committee
- James Brisbois (Chemistry), Advisor: V. Cornish, qualifying exam committee
- Nathan Jaffe (Biology), Advisor: Ruben Gonzales, thesis committee
- Mariam Konate (Graduated 2014, C2B2), Advisor: D. Vitkup, thesis committee

GRADUATE STUDENTS MENTORSHIP

- Nathan Johns (G5, Integrated/C2B2 Program) – current
- Sway Chen (G4, MD/PhD) – current
- Tom Blazejewski (G4, Integrated/C2B2 Program) – current
- Jimin Park (G4, Integrated Program) – current
- Ravi Sheth (G3, Integrated/C2B2 Program) – current
- Frank Cusimano (G3, Nutritional and Metabolic Biology Program) – current
- Ross McBee (G3, Biological Sciences Program) – current
- Florencia Velez-Cortes (G2, Integrated/C2B2 Program) – current
- Miles Richardson (G1, Integrated/C2B2 Program) – Fall 2017 rotation
- Sydney Blattman (G1, Integrated/C2B2 Program) – Spring 2018 rotation
- Yiming Huang (G1, Integrated/C2B2 Program) – Spring 2018 rotation
- Victoria Stockman (Integrated/C2B2 Program) – graduated
- Felix Wu (G1, Integrated/C2B2 Program) – Spring 2017 rotation
- Hannah Levitin (Integrated/C2B2 Program) – Fall 2015 rotation
- Emily Groopman (MD/PhD rotation), Summer 2015 rotation
- Julian Berger (Integrated Program rotation), Spring 2015 rotation
- Zach Baker (Integrated Program rotation), Fall 2014 rotation
- Tal Lorberbaum (Integrated Program rotation), Fall 2013 rotation
- John Szymanski (Integrated Program rotation), Fall 2013 rotation

UNDERGRADUATE STUDENTS MENTORSHIP

- Jennifer Fang (Columbia) Summer 2017-current [Biology major]

- Tarun Srinivasan (Columbia) Summer 2017-current [Biochemistry major]
- Suppawat Kongthong (Columbia) Spring 2015-Spring 2017 [Biology major]
- Jacky Cheung (Columbia) Summer 2014-Summer 2017 [CS major]
- Sam Magaziner (Columbia) Summer 2015-Spring 2016 [Biochemistry major]
- Kellie Lu, (Columbia) Summer 2015 [CS major]
- Anthony Yang, (Columbia) Summer/Winter 2013 [BME major]
- Daniel Huang, (Columbia) Summer 2013 [BME major]

POST-DOCTORAL FELLOWS MENTORSHIP

- Hsing Ho (Baylor, Microbiology) 9/1/2015 - present
- Carlotta Ronda (DTU, Microbiology) 1/15/2016 – present
- Sung Sun Yim (KAIST, Synthetic Biology/Microbiology) 10/12/2016 - present
- Christian Munck (DTY, Microbiology) 1/2/2017 - present
- Liyuan Liu (CAS, Synthetic Biology) 10/1/2017 - present
- Vitor Cabral (Institut Pasteur, Microbiology) 9/1/2014 – 4/30/2016
- Antonio Gomes (BU, Bioinformatics) 1/15/2014 – 11/30/2016

FUNDING

Ongoing Research Support

NSF MCB-1453219 (PI: Wang) 01/01/15 – 12/31/19
A Systems Approach to Study Horizontal Acquisition of Regulatory DNA
Area: To elucidate key new insights into HGT, characterize regulatory networks in diverse microbes, and develop synthetic gene circuits to program gene regulation in new hosts.

NIH/NIGMS 1 U01GM110714-01A1 (PI: Sean Brady, Co-I: Wang) 4/01/15 – 03/31/19
A minimally invasive synthetic biology-driven approach for natural products discovery
Area: To develop methods to activate cryptic gene clusters for natural product biosynthesis and discovery.

ONR N00014-15-1-2704 (PI: Wang) 6/1/15 – 5/31/18
A Foundational Synthetic Biology Toolbox for Engineering Human Gut Microbiota towards Enhancing Warfighter Capabilities
Area: To develop genome manipulation, transformation, and plasmid acquisition methods for GI microbes.

NIH/NCI 1U54CA209997-01 (PI: Andrea Califano, Co-I: Harris Wang) 8/8/16 – 8/7/21
Centers for Cancer Systems Therapeutics (CAST)
Area: Application of computational and experimental systems biology approaches to dissect cancer drivers and generate therapeutic methodologies.

ONR N00014-17-1-2353 (PI: Wang) 3/1/17 – 2/28/21
Next-Generation Massively Parallel Cellular Biosurveillance and Recording Devices
Area: Engineering genomically encoding memory devices in bacterial systems for environmental sensing applications. Role: Principal Investigator

DARPA HR0011-17-2-0041 (PI: Wang) 5/1/17 – 2/28/19
Engineering Prototrophy in Mammalian Cells
Area: Mammalian metabolic engineering to introduce pathways for essential amino acid biosynthesis. Role: Principal Investigator

NIH/NIAID 1R01AI132403-01 (PI: Wang) 6/1/17 – 5/31/22
Micron-scale Spatial Metagenomic Mapping of Microbial Biogeography in the Gastrointestinal Tract
Area: To develop spatial biogeography technique to interrogate the distribution of microbiota in murine models during dietary and antibiotic perturbations.

DARPA HR0011-17-C-0068 (PI: Damen Schaak, Co-I: Wang) 7/1/17 – 6/31/21
Sustainable Biologically Active Modular Building Materials
Area: Genomic and metagenomic analysis and engineering of multi-species microbial-fungal consortium for engineered living materials.

Burroughs Wellcome PATH grant 1016691 (PI: Wang) 9/1/17 – 8/31/22
Mapping host-microbe and inter-microbial networks at ultra-high spatial resolution
Area: Assessment of microbial biogeography during pathogenic colonization.

Completed Research Support

NIH/NIDCR 1 DP5 OD 009172-02 (PI: Wang) 9/20/11 – 5/31/17
Functional Metagenomic Reprogramming of the Human Microbiome through Mobilome Engineering
Area: To develop foundational technologies to enable the genetic manipulation of microbes that are commonly associated with the human body using mobile genetic elements.

DARPA W911NF-15-2-0065 (PI: Wang) 07/01/15 – 8/30/17
In situ Genome Engineering of Unculturable Microbes and Genomic Recoding to Limit Genetic Code
Area: To develop genetic methods for unculturable microbes and strategies to resist genetic drift of DNA.

Sloan Foundation FR-2015-65795 (PI: Wang) 9/15/15 – 9/14/17
Evolutionary Drivers of Horizontal Gene Flow
Area: To develop computational and experimental techniques to dissect governing principles that drive horizontal gene flow in microbial communities.