Benjamin CHAN Ph.D.

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Education

University of Utah
Ph.D. Biology
2004-2008

University of Utah
B.S. Biology
1999-2002

Proficiencies

Visual Basic 6, Python 2.7
HTML5/CSS3
Microsoft Office
MS Windows, UNIX (free BSD)
Confocal Microscopy
Bacteria/Bacteriophage Culture
Bacteriophage isolation
BSL-2+ Safety
PCR, qPCR,
Nucleic acid extraction
Fluorescent cell labeling
Animal husbandry (Mouse, Amphibian, Reptile)
English (proficient), Basic Japanese, Basic Chinese(Mandarin/Cantonese), Basic Spanish

Appointments

- Associate Research Scientist, Department of Ecology and Evolutionary Biology. Yale University. Sep2013-present
- Fellow, Department of Internal Medicine (Division of Infectious Diseases). University of Utah School of Medicine: Nov2011-Sep2013
- Research Assistant Professor, Department of Biology. University of Utah: Jan2010-Sep2013
- Senior Laboratory Specialist, Fluorescence Microscopy Core Facility. University of Utah School of Medicine: Jun2009-Nov2011
- Research Scientist, OmniLytics, Inc. Salt Lake City, UT: Jun2008 – Jun2009

Selected Publications

Kortright, K.E., **Chan, B.K**., Koff, J., Turner, P.E. 2019. Phage Therapy: A renewed approach to combating antibiotic resistant bacteria. Cell Host & Microbe (*in press*)

Burmeister, A.R., Bender, R.G., Fortier, A., Lessing, A., **Chan, B.K.**, Turner, P.E. 2018. Two newly-isolated lytic phages that depend on *Escherichia coli* multi-drug efflux gene *tolC* differentially affect bacterial growth and selection. AEM (*submitted*)

Nagel, T.E., **Chan, B.K**., Nale, J.Y., Clokie, M.R.J. 2018. Phages as Antibacterial Agents – Laboratory Training in Developing Countries. Chapter in AMR Control 2018.

Chan, B.K., Turner, P.E., Kim, S., Mojibian, H.R., Elefteriades, J.A., Narayan, D. 2018 Successful Treatment of Prosthetic Vascular Graft Infection with phage OMKO1. Evolution, Medicine, and Public Health 28(1):60-66

Kriesel, J.D., Bhetariya, P.J., **Chan, B.K**., Wilson, T., Fischer, K.F. 2017. Enrichment of Retroviral Sequences in Brain Tissue from Patients with Severe Demyelinating Diseases. J of Emerging Diseases and Virology. 3(2)

Chen, L.L., Zhu, J., Schumacher, J., Wei, C., Ramadas, L., Prieto, V.G., Jimenez, A., Velasco, M.A., Tripp, S.R., Andtbacka, R.H.I., Gouw, L., Rodgers, G.M., Zhang, L., **Chan, B.K**., Cassidy, P.B., Benjamin, R.S., Leachman, S.A., Frazier, M.L. 2017. PLoS ONE 12(9): e0184154

Chan, B.K., Brown, K., Kortright, K.E., Mao, S., Turner, P. 2016. Extending the lifetime of antibiotics: how can phage therapy help? Future Microbiology 2016.

Nagel, T.E., **Chan, B.K.**, DeVos, D., El-Shibiny, A., Kang'ethe, E., Makumi, A., Pirnay, J. 2016. The Developing World Urgently Needs Phages to Combat Pathogenic Bacteria. Front Microbiol 7:882

Chan, B.K., Sistrom, M., Narayan, D., Turner, P. 2016. Phage selection restores antibiotic susceptibility in MDR *Pseudomonas aeruginosa*. Scientific Reports 6, Article number: 26717

Akusobi, C., **B. Chan**, J. Wertz, and P.E. Turner. 2015. Convergent evolution of host-attachment proteins in phage PP01 populations adapting to Escherichia coli O157:H7. Applied and Environmental Microbiology (In revision)

Chan, B.K., Abedon, S.T. 2015. Bacteriophages and their Enzymes in Biocontrol. Current Pharmaceutical Design 21(1):85-99.

Chan, B.K., Wilson, T.W., Fischer, K.F., Kriesel, J.D. 2014. Deep Sequencing to Identify the Causes of Viral Encephalitis. PLoS ONE 9(4): e93993

Chan, B. K., Abedon, S. T., Loc-Carrillo, C**.** 2013. Phage Cocktails and the Future of Phage Therapy. Future Microbiology 8:769-783

Chan, B.K., Abedon, S.T. 2012. Phage Therapy Pharmacology: Phage Cocktails. Adv Appl Microbiol. 2012;78:1-23.

Chan, B.K., Abedon, S.T. 2011. Bacteriophage Adaptation, With Particular Attention to Issues of Phage Host Range. In: Bacteriophages in Dairy Processing. Quiberoni, A., Reinheimer, J.(eds), Nova Science Publishers, Hauppauge, New York

Chen, L.L., Chen, X., Choi, H., Chen, L.C., Gouw, L., Andtbacka, R.H., Zhang, H., Jimenez, A., Rodesch, C.K., **Chan, B.K.**, Jones, K.A., Martins, ., Hill, H.R., Schumacher, J., Willmore, C., Scaife, C., Ward, J.H., Morton, K., Randall, R.L., Lazar, A.J., Trent, J.C., Patel, S., Frazier, M.L., Jensen, P., Benjamin, R.S. 2011. Imatinib plus Peginterferon α-2b Induce IFN-γ–Producing Lymphocytes in Blood and Tumor Sites and Correlate with Improved Clinical Outcome of Gastrointestinal Stromal Tumor. Cancer Research.

Chan, B.K., Mirabello, M., Ferguson, J.W., Farmer, C.G. 2011. Fluctuating Pattern Asymmetry of the Neotropical Poison Frog, Dendrobates auratus as an Indicator of Habitat Quality. Conservation Biology (in revision)

Chan, B. K., A. L. Peterson and C. G. Farmer. 2007. Dendrobates auratus (Green and Black Poison Dart Frog) Larval Predation. Herpetological Review 38(3): 321-322

Chan, B.K. 2009. Dendrobates auratus (green and Black Dartpoison Frog). Diel Activity. Herpetological

Teaching/Seminars

2019 **Lecturer**, Phage discovery workshop*, Accra, Ghana
2019 **Invited Speaker**, Bacteriophage Therapy Summit, Boston, MA
2019 **Invited Speaker**, Mechanisms of Disease Seminar Series, UA/AUG, Athens, GA
2019 **Invited Speaker**, Phage Futures Congress, Washington D.C.
2018 **Invited Speaker**, CCID, Pennsylvania State University, State College, Pennsylvania
2018 **Lecturer**, Phage discovery workshop*, University of Nairobi, Nairobi, Kenya
2018 **Speaker**, American Society of Microbiology, Atlanta, Georgia
2018 **Invited Speaker**, Association for Professionals in Infection Control and Epidemiology (APIC), Springfield, MA
2017 **Lecturer,** Phage discovery workshop, Makerere University, Kampala, Uganda
2017 **Invited Speaker**, National Institutes of Health/NIAID workshop, Bethesda, MD
2016 QSB **Invited Seminar Speaker**, UC, Merced
2016 **Invited Seminar Speaker**, National Institutes of Health, Bethesda, MD
2016 Guest Lecture, EEB460/461: Studies in Evolutionary Medicine, Yale University
2016 Guest Lecture, Pathways to Science Summer Scholars Program, Yale University
2015 **Primary Instructor** (designed/taught course), BIO214: Evolution, Wesleyan University
2015 **Primary Instructor** (designed/taught course), BIO220: Ecological Physiology, Wesleyan University
2015/2015 Invited Outreach Speaker, AW Cox school
2015 Teaching Fellow, BIO104: General Biology, Yale University
2014 **Invited Speaker**, Wesleyan University
2012 **Invited Speaker**, Infectious Diseases Rounds, University of Utah School of Medicine.
2009 **Invited Seminar Speaker**, University of Minnesota Herpetology Society
2007 Invited Lecture, University of Utah Natural History Museum
2007 **Invited Speaker**, University of Utah Natural History Museum
2006 Teaching Assistant, BIO 102: Plants and Society, University of Utah
2006/2005 Laboratory instructor, Comparative Physiology, University of Utah
2004 Teaching Assistant, Wildlife Ecology, University of Utah
2006/2004 Teaching Assistant, Introduction to Biology, University of Utah
2003 Laboratory instructor, Basic Laboratory Techniques for Learning Engagement Achievement Progress Program, University of Utah
2003/2002/2001 Laboratory Instructor, Basic Laboratory Techniques, University of Utah

*One additional courses funded for 2020 in Tanzania

Awards

2017 Cystic Fibrosis Foundation – Using phage selection to force drug sensitivity in MDR *P. aeruginosa* ($100,000)
2017 Conservation, Food, and Health Foundation – *Developing a collaborative network of east African scientists to advance phage technology to combat antibiotic resistance* (approx. $30,000)
2017 NIH/NIAID Preclinical Services Grant* – *Testing safety/efficacy of phage-antibiotic adjuvants in murine models of MDR Pseudomonas aeruginosa infections*
2016 NIH/NIAID Preclinical Services Grant* – *Testing safety/efficacy of phage-antibiotic adjuvants in murine models of MDR Pseudomonas aeruginosa infections*
2015-2017 Project High Hopes Grant (approx. $150,000) – *Virulence targeting antibiotics*
2013-2015 Project High Hopes Grant (approx. $150,000) – *Virulence targeting antibiotics*
2010 Center on Aging Pilot Grant, University of Utah (approx. $25,000) – *Microchimerism hypothesis for the pathogenesis of Alzheimer's Disease*
2010-2011 Next Stage Technology Commercialization Pilot Grant (approx. $10,000), University of Utah
2008 Internal Project Funding, OmniLytics, Inc.
2003/2003/2002/2002/2002/2001 Bioscience BioURP Research Mini-Grant (approx. $30,000)

*amount TBD by NIH/NIAID CRO. Objective of grant is to produce large-scale animal model data to move a product into Phase I clinical trials in humans.

Conferences and Professional Meetings

Chan, B.K., Koff, J., Turner, P.E. 2019 Phage Futures Congress, Washington, D.C. USA

Centennial Celebration of Bacteriophage Research 2017. Pasteur Institute, Paris, France

Sistrom M, **Chan B**, Turner P, Exploiting an evolutionary trade off to eliminate multi-drug resistance in pathogenic bacteria, Evolution Conference, Texas, 2016

Ul-Hasan S, Sistrom M, **Chan B**, Investigating evolutionary viability of bacterial efflux pumps for innovative phage therapy, Evolution Conference, Texas, 2016

Chan, BK, Kim, S., Turner, PE, Narayan, D. Experimental Phage Therapy to Treat a Persistent Pseudomonas aeruginosa Infection Associated with an Aortic Arch Replacement. CT Chapter of the American College of Surgeons, 2016

Chan, BK, Turner, PE, Kim, S, Mojibian, HR, Elefteriades, J, Narayan, D. Experimental Phage Therapy to Treat a Recalcitrant Pseudomonas aeruginosa Infection. Bacteriophages conference, Moscow, RUS, 2016

Evergreen Phage Meeting 2015 – Member of Conference Organizing Committee

Chan, BK, Turner, PE, Kim, S., Narayan, D. Phage therapy for antibiotic resistant infections. New England Society of Plastic Surgeons. Pennsylvania, 2015

Chan, BK. Treatment of a Pseudomonas aeruginosa infection in a human patient with a bacteriophage cocktail. Viruses of Microbes: Structure and Function, from molecules to communities. Zurich, CH, 2014

Kriesel, J, **Chan, BK,** Wilson, T, Fischer, K. Deep sequencing for the detection of microbes in brain from patients with primary progressive multiple sclerosis. ACTRIMS, Florida, 2014.

Chan, BK, Wilson, T., Fischer, K., Kriesel, J. Deep sequencing of Primary Progressive Multiple Sclerosis and Encephalitis Brain. Consortium of Multiple Sclerosis Centers Americas Committee for Treatment and Research in Multiple Sclerosis. Florida 2012.

Peer Review Activities

Aquaculture Research; Frontiers in Microbiology, section Antimicrobials, Resistance and Chemotherapy; BMC infectious diseases; International Journal of MS Care; PLoS ONE; Journal of Theoretical Biology; and, Future Virology

Select List of Media Featuring My Work

Title TBD Scientific American. Charles Smith (*in press*) 2019
Title TBD (Associated Press 2019)
"The Truth about Antibiotics" (BBC One 2019)
Canada Broadcast Corporation. Jan 11 2019. Quirks and Quarks Interview

“Follow This” Netflix Series season 1 episode 17.
“Paige’s Phages” (documentary, 2019)
Public Radio International. March 9, 2018. NPR Science Friday interview on phage therapy.
“Evolution and Phage” Aeon Magazine. Emily Monosson. (*in press*) 2018.
On the Fringe. S1E1. Watch on Facebook, Facebook.
Viruses are the Antibiotics of the Future. Motherboard VICE
“Will viruses save us from superbugs?” Nautilus. Katharine Walter, December 2016.
“A virus, fished out of a lake, may have saved a man’s life — and advanced science” STAT News. Carl Zimmer, December 2016.
The People’s Pharmacy. July 2016. Show 1052: The Challenge of Antibiotic Resistant Superbugs.
Public Radio International. June 3, 2016. NPR Science Friday interview on phage therapy.
“Viruses Could Help Save Us from the Antibiotic Apocalypse” VICE, Kaleigh Rogers. May 2016
“Phage fishing yields new weapon against antibiotic resistance.” Science Daily, May 2016
“Newly Discovered Phages Can Target Antibiotic Resistance” MedicalResearch.com May 2016
“Bacteriophage found in a pond can fight superbugs.” MedIndia. May 2016
“How Viruses Can Help Us Fight Bacteria When Antibiotics Fail.” Motherboard. 2016
“Frog Skin!” Scientist in the spotlight, Utah Museum of Natural History April 2009
“It isn’t easy being green!” Scientist in the spotlight, Utah Museum of Natural History April 2008
“Live frogs carry message of hope”, The Daily Utah Chronicle, 11 June, 2007
“Ribbit exhibit: Learn all about frogs at Utah Museum of Natural History”, The Deseret News, 11 June, 2007
“’Toadally Frogs’ Program Hops Into Town”, Salt Lake Tribune, 11 June 2007