

Andrew C Tolonen

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EDUCATION

Harvard Medical School Boston MA, USA

(2007-present) Postdoctoral Fellow in microbial systems/synthetic biology

Institut Pasteur Paris, France

(2006) Postdoctoral Fellow in cyanobacterial genomics

Massachusetts Institute of Technology Cambridge MA, USA

(1999-2005) PhD in cyanobacterial genetics/genomics

Dartmouth College Hanover NH, USA

1994-1998 undergraduate BA with high honors in biology

FELLOWSHIPS/AWARDS

2008-2010 Sponsored Research Award from Qteros Inc. (2.5y support)

2006 Chateaubriand Fellow, Ambassade de France (1y support)

2003-2005 NSF Graduate Fellow (3y support)

2001-2002 Merck Fellow in Biological Informatics (2y support)

2000 MIT Parsons Fellow (1y support)

1998 Winner of Sigma Xi science competition, Dartmouth College

1996-1997 NSF REU Fellowship, Dartmouth College

RESEARCH EXPERIENCE

Harvard Medical School Advisor: George Church

Systems biology of plant biomass fermentation. Identified proteome-wide changes enabling cellulosic fermentation by *Clostridium phytofermentans* using quantitative mass spectrometry (ReDi proteomics). Developed methods for gene inactivation and over-expression in *C. phytofermentans* to validate targets identified by proteomics and to engineer strains with enhanced cellulosic ethanol formation.

Collaborated on large scale genome engineering of *E. coli* to generate a strain in which all TAG stop codons are replaced with TAA stop codons.

Institut Pasteur Advisor: Nicole Tandeau de Marsac

Transcriptional profiling and genome analysis to study light stress and microcystin toxin formation in the fresh water cyanobacterium *Microcystis* PCC 7806.

Massachusetts Institute of Technology and Woods Hole Oceanographic Institution. Advisor: Sallie (Penny) Chisholm

Developed genetic manipulation tools for the marine cyanobacterium *Prochlorococcus* and devised a systems-biology approach to explain differences in nitrogen-regulated gene expression between *Prochlorococcus* ecotypes.

Dartmouth College Advisor: Mark McPeck

-Senior honors thesis "Changes in zooplankton community composition in response to nutrient perturbations".
-Biology Foreign Study Program in tropical ecology, Costa Rica/Jamaica

PUBLICATIONS

Isaacs FJ, Carr PA, Wang HH, Sterling B, Lajoie MJ, Kraal L, **Tolonen AC**, Reppas NB, Eming CJ, Bang D, Hwang SJ, Jacobson JM, Church GM. (2011) Genome-wide codon replacement using synthetic oligonucleotides and engineered conjugation. (in revision).

Tolonen AC, Haas W, Chilaka AC, Aach J, Gygi S, Church GM (2011). Proteome-wide systems analysis of a cellulosic biofuel producing microbe. *Molecular Systems Biology* 7:461.

Tolonen AC, Chilaka AC, Church GM. (2009). Targeted gene inactivation in *Clostridium phytofermentans* shows that cellulose degradation requires the family 9 hydrolase Cphy3367. *Molecular Microbiology* 74(6):1300-13

- Review of our study: Wilson DB. (2009). The first evidence that a single cellulase can be essential for cellulose degradation in a cellulolytic microorganism. *Molecular Microbiology* 74(6):1287-8

Frangeul L, Quillardet P, Castets AM, Humbert JF, Matthijs HC, Cortez D, **Tolonen A**, Zhang CC, Gribaldo S, Kehr JC, Zilliges Y, Ziemert N, Becker S, Talla E, Latifi A, Billault A, Lepelletier A, Dittmann E, Bouchier C, de Marsac NT. (2008). Highly plastic genome of *Microcystis aeruginosa* PCC 7806, a ubiquitous toxic freshwater cyanobacterium. *BMC Genomics* 9:274

Tolonen AC, Liszt GB, Hess WR. (2006). Genetic manipulation of *Prochlorococcus* MIT 9313: GFP expression in an RSF1010 plasmid and Tn5 transposition. *Applied and Environmental Microbiology*. 72(12): 7607-13.

Tolonen AC, Aach J, Lindell D, Johnson ZI, Rector T, Steen R, Church GM, Chisholm SW. (2006). Global gene expression of *Prochlorococcus* ecotypes in response to changes in nitrogen availability. 2006. *Molecular Systems Biology* (Oct 2006 doi:10.1038).

Tolonen AC. (2005). *Prochlorococcus* genetic transformation and the genomics of nitrogen metabolism. PhD Thesis MIT, Cambridge MA.

Lindell D, Sullivan MB, Johnson ZI, **Tolonen AC**, Rohwer F, and Chisholm SW. (2004). Transfer of photosynthetic genes to and from *Prochlorococcus* viruses. *Proceedings of the National Academy of Sciences, USA*. (101): 11013-11018.

Rocap G, Larimer FW, Lamerdin J, Malfatti S, Chain P, Ahlgren NA, Arellano A, Coleman M, Hauser L, Hess WR, Johnson ZI, Land M, Lindell D, Post AF, Regala W, Shah M, Shaw SL, Steglich C, Sullivan MB, Ting CS, **Tolonen A**, Webb EA, Zinser ER, Chisholm SW. (2003). Genome divergence in two *Prochlorococcus* ecotypes reflects oceanic niche differentiation. *Nature* 424 (6952): 1042-1047.

Lee SS, Kennedy S, **Tolonen AC**, Ruvkun G. (2003). DAF-16 target genes that control *C. elegans* life-span and metabolism. *Science* 300 (5619): 644-647.

Tolonen, AC, Albeanu DF, Corbett JF, Handley H, Henson C, Malik P. (2002). Optimized *in situ* construction of oligomers on an array surface. *Nucleic Acids Research* 30 (20): e107.

TEACHING EXPERIENCE

2010 Advising part-time research projects of Andrew Cohen, a Harvard University undergraduate.

2007-2009 Advised full-time research projects for Amanda Chilaka, an intern in the NHGRI Minority Action Program. Amanda is now a biology PhD student at Northeastern Univ, Boston MA USA

2007 Advised full-time summer research projects for Samuel Bjork, a Harvard undergraduate. Sam is now a Marshall Scholar in synthetic biology at Cambridge Univ, UK

2004 Taught lecture series "Programming fundamentals for the computational biologist" at Marine Biology Lab, Woods Hole for the MBL/TIGR Genome Technology Course

PRESENTATIONS IN 2010

October 2010. Dept Seminar, Harvard Medical School Genetics, Boston MA

August 2010. Invited seminar at Boston University, MA

May 2010. Invited seminar at Qteros Inc, Marlborough MA.

April 2010. Invited seminar at Northeastern University, Boston MA.

February 2010. Presented at US Dept of Energy Genomic Sciences Workshop, Washington DC.

OTHER ACTIVITIES

- Randonneur bicycling. Rode Paris-Brest-Paris 2007 in 72h40m and the Boston Brevet series 2007-2010.
- Member of the Club de Lecture de La littérature Française at Harvard University 2007-present
- Volunteer bicycle mechanic for non-profit Bikes Not Bombs

PRIMARY REFERENCES

Prof George Church (advisor 2007-present)
Harvard Medical School

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Prof Susan Leschine (current collaborator)
Department of Microbiology
203 Morrill Science Center IVN
University of Massachusetts
639 North Pleasant Street
Amherst, MA 01003

Prof Nicole Tandeau de Marsac (advisor 2006)
Laboratoire de Chimie Bactérienne
CNRS-UPR9043
31 chemin Joseph Aiguier
13402 Marseille cedex 20
France

Prof Sallie (Penny) Chisholm (advisor 2000-2005)
Dept of Biology, Environmental Engineering
MIT 48-419
15 Vassar Street
Cambridge, MA 02139