

Shiou-chi (Steven) Chang

70 Pacific St., Apt 666B
Cambridge MA 02139

Phone: 217-721-3167 · Email: schang24@mit.edu
Linkedin profile: www.linkedin.com/in/scschang

EDUCATION

Massachusetts Institute of Technology

Ph.D. Candidate in Biological Engineering (GPA: 5.00/5.00) 2010 – 2016
Thesis (working title): Investigating the Toxicity and Mutagenicity of Etheno DNA Lesions and the Fundamental Properties of DinB with a High-Throughput Method (projected)
Minor: Finance in Life Sciences
Business courses: Finance Theory I, Finance Theory II, Investments, Strategic Decision Making in Life Sciences, Power and Negotiation

University of Illinois at Urbana-Champaign

Bachelor of Science in Chemical Engineering (GPA: 3.96/4.00) 2005 – 2009
University Honor, Summa Cum Laude
Concentration: Biomolecular Engineering, **Minor:** Bioengineering

SKILLS & EXPERTISE

Cell culturing, Molecular cloning, Site-specific mutagenesis, Illumina sequencing, Python programming, Mass spectrometry, HPLC, Financial analysis

RESEARCH EXPERIENCE

Professor John Essigmann's Laboratory for DNA Damage, Repair and Cancer

Department of Chemistry and Biological Engineering, MIT

Research Assistant

2011 – Present

My research focuses on investigating the genotoxicity, mutagenicity and repair of etheno and butadiene-induced DNA lesions in vivo to obtain a mechanistic understanding of the connection between DNA damage and the mutations that drive carcinogenesis.

- Developed a multiplex, next-generation sequencing methodology for studying lesion-induced mutagenesis, which reduced the time and material cost of the assay by ~80% and ~25%, respectively.
- Determined that the $N^2,3$ -ethenoguanine lesion is likely to have a functional role in inducing liver angiosarcoma, which was published as a “breakthrough article” in *Nucleic Acids Research* and reported in MIT News.
- Showed that neonatal exposure to aflatoxin in mice significantly increased the mutation level in mouse liver, which elevated the risk of developing liver cancer.
- Mentored 2 undergraduate researchers by teaching them fundamental biochemistry and DNA repair concepts and training them in basic experimental technique.
- Serve as the Environmental Health and Safety officer for the laboratory, responsible for giving safety training to all incoming personnel and inspecting the laboratory to ensure the adherence to safety protocols.

Professor Yingxiao Peter Wang's Laboratory for Single-Cell Imaging & Reprogramming

Department of Bioengineering, UIUC

Undergraduate Researcher

2008 – 2010

- Investigated factors that govern focal adhesion dynamics in live cells using FRET biosensors.
- Demonstrated local Src and Rac activities may influence focal adhesion disassembly, which could potentially explain the metastasis process of cancer cells.

Professor Eric Oldfield's Laboratory for Drug Discovery

Department of Chemistry, UIUC

Undergraduate Researcher

2006 – 2007

- Worked with a postdoc researcher to synthesize ~15 bisphosphonates compounds that were later evaluated for tumor inhibition activity in medicinal research.

PUBLICATIONS

Chang SC, Fedeles BI, Wu J, Delaney JC, Li D, Zhao L, Christov PP, Yau E, Singh V, Jost M, Drennan CL, Marnett LJ, Rizzo CJ, Levine SS, Guengerich FP, & Essigmann JM (2015) Next-generation sequencing reveals the biological significance of the $N^2,3$ -ethenoguanine lesion *in vivo*. *Nucleic Acids Res.* (**Published as a Breakthrough Article**)

Fedeles BI, Freudenthal BD, Yau E, **Chang SC**, Singh V, Li D, Wilson SH, Essigmann JM (2015) The intrinsic mutagenicity of 5-chlorocytosine as a functional link between inflammation and cancer. *Nat Struct Mol Biol.* (Submitted)

Lu S, Seong J, Wang Y, **Chang SC**, Eichorst JP, Ouyang M, Li JY, Chien S, & Wang Y (2014) Decipher the dynamic coordination between enzymatic activity and structural modulation at focal adhesions in living cells. *Scientific reports* 4:5756.

Wattanawaraporn R, Woo LL, Belanger C, **Chang SC**, Adams JE, Trudel LJ, Bouhenguel JT, Egner PA, Groopman JD, Croy RG, Essigmann JM, & Wogan GN (2012) A single neonatal exposure to aflatoxin B₁ induces prolonged genetic damage in two loci of mouse liver. *Toxicol. Sci.* 128(2):326-333.

Chen CKM, Hudock MP, Zhang Y, Guo RT, Cao R, No JH, Liang PH, Ko TP, Chang TH, **Chang SC**, Song Y, Axelson J, Kumar A, Wang AH, & Oldfield E (2008) Inhibition of geranylgeranyl diphosphate synthase by bisphosphonates: a crystallographic and computational investigation. *J. Med. Chem.* 51(18):5594-5607.

RESEARCH PRESENTATIONS

“Next Generation Sequencing Reveals the Biological Consequences of Ethenoguanine Lesions *In Vivo*”: Poster presentation at the Boston Taiwanese Biotechnology Symposium June 2014

“Next Generation Sequencing Reveals the Biological Consequences of Ethenoguanine Lesions *In Vivo*”: Poster presentation at the MIT Center for Environmental Health Sciences poster session May 2014

“Next Generation Sequencing Reveals the Biological Consequences of Ethenoguanine Lesions *In Vivo*”: Talk given to the Department of Biological Engineering and the MIT community Feb 2014

“Developing a Multiplex Approach to Quantify Biological Consequences of Site-Specific DNA Lesions *In Vivo*”: Poster presentation at the MIT Biological Engineering retreat Oct 2013

“Developing a High-Throughput Method for Studying Site-Specific DNA Lesions *In Vivo*”: Talk given to the Department of Biological Engineering and the MIT community Nov 2012

TEACHING EXPERIENCE

Massachusetts Institute of Technology

20.380 – Biological Engineering Design

Spring 2012

Professor Forest White, Darrell Irvine and Katharina Ribbeck, Department of Biological Engineering

Teaching Assistant

- Guided students in discussions to help them turning their ideas into design proposals.

University of Illinois at Urbana-Champaign

Chem104 – General Chemistry II

Professor Christian Ray, Department of Chemistry

Spring 2009

Chem102 – General Chemistry I

Professor Christine Yerkes, Department of Chemistry

Fall 2008

Teaching Assistant

- Lectured discussion sessions after regular classes and hold office hours.
- Guided students to acquire further understanding in Chemistry.
- Rated as an excellent teaching assistant for two consecutive semesters based on students' evaluations.

CONSULTING EXPERIENCE

2014 Harvard-MIT Case Competition

Aug 2014

Winner (1st place out of 20 teams)

- Collaborated with 3 MIT students with no prior connection over 2 weeks to provide growth strategies to Cloudsourced Accounting, an online bookkeeping startup based in California.
- Recommended on target industry sectors, target geographical regions and marketing strategies to help the startup achieving its desired growth rate.
- Received the highest score in recommendations, presentation and teamwork categories in the final presentation, which was judged by a panel of ~20 consultants and the founders of the startup.

HONORS & AWARDS

MIT Presidential Fellow

Sep 2010

University Honors

May 2009

Highest recognition for undergraduate excellence with GPA within the top 3% of the graduating class

James Scholar Graduation Honors

May 2009

For outstanding academic achievement and sustained participation in advanced coursework

Summa Cum Laude

May 2009

Highest Distinction in Chemical Engineering

May 2009

CITGO Award

Feb 2009

Glenn E. and Barbara R. Ulliyot Scholarship

May 2008

Al and Jan Widiger Award

Apr 2008

Dean's List

2005 – 2008

LEADERSHIP

Sidney-Pacific Graduate Community

Sidney-Pacific (SP) represents about 10% of the MIT graduate student population, making it the largest graduate residence at MIT. Known for its strong student leadership and excellent programs, the house government at SP is completely run by graduate students and operates on an annual budget of approximately \$140,000.

Trustee

2014 – Present

- Advise the Sidney-Pacific house government.
- Exercise judicial powers of the Sidney-Pacific Graduate Community.

Vice President of Information

2013 – 2014

- Served as one of the 5 members in the Sidney-Pacific Executive Council, which

oversaw the entire operation of Sidney-Pacific, including event planning and budget managing.

- Worked with the professors in residence (housemasters) and house manager to resolve issues that affected student life and improve the quality of life in the residence.
- Managed 11 officers under the Office of Information.

Publicity Chair

2012 – 2013

- Coordinated with two other publicity co-chairs to publicize events at SP to residents and MIT community.
- Designed more than 50 posters during the year.

Newsletter Chair

2011 – 2012

- Edited monthly newsletter for distributing announcements and event information to residents.
- Reduced printing costs by implementing electronic version of the newsletter.
- Received a Service Award in summer 2011 for “producing one of the best orientation newsletters SP has ever seen”.

Asian American Student Housing Organization

Found in 2006, Asian American Student Housing Organization (AASHO) advocates Asian American student’s rights in the undergraduate dormitories and increases cultural awareness in the community.

Founding Officers

2006 – 2007

- Worked in a team to support Asian American students and develop a stronger community in the resident halls.
- Hosted various events to promote cultural awareness.

ADDITIONAL INFORMATION

Language: Mandarin (fluent, native)

Interest: Photography

Fun fact: Attended high school in South Africa