BIOGRAPHICAL SKETCH

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NAME: Chongli Yuan

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POSITION TITLE: Davidson Associate Professor of Chemical Engineering

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
East China University of Science and Technology, Shanghai, China	B.S.	07/2002	Chemical Engineering
Cornell University, Ithaca, NY	Ph.D.	05/2007	Chemical and Biomolecular Engineering
ETH, Zürich, Switzerland	Postdoc	08/2009	Molecular Biology and Biophysics

A. Personal Statement

I am an Associate Professor of Chemical Engineering at Purdue University. I was trained as a chemical engineer and biophysicist, my primary area of research is to develop engineering tools and algorithm to understand the effects of external stress, including dietary factors, drugs and environmental chemical exposures, on human health. I am particularly interested in integrating information from multi-dimensional measurements, such as omics, imaging and clinical data, to understand the complex interaction network that drive the establishment a novel phenotype. I have been PIs on multiple NSF grants that aim to develop novel bioengineering tools to monitor and/or recapitulate complex biological systems. My group was also funded by US Army, and several research foundations.

Ongoing Research Support and/or Scholastic Performance

- NSF (07/01/2017-06/30/2022): Enhancing Transgene Expression and Retention by Co-delivery of DNA Vectors with Modified Histones. *Role*: PI (co-I: Ann Kirchmaier, Yoon Yeo)
- NSF (08/01/2019-07/30/2023): Collaborative Proposal: Bottom-up Construction of a Synthetic Neuron and Programmable Neuronal Network. *Role*: PI (PIs: Allen Liu (Michigan), Sindy Tang (Stanford), TJ Ha (JHU), Barbara Horton (UCSB), Moi Das (RIT))
- Purdue Institute of Inflammation, Immunology and Infectious Disease and Purdue College of Health and Human Science. (03/01/2020 – 02/28/2021). Microfluidics brain-on-a-chip device for real-time analysis of intra and extracellular reporters of neural health. *Role*: co-I (PI: Aaron Bowman; co-I: Steven Wereley, Hyown Lee)
- Purdue Institute for Integrative Neuroscience (07/01/2020-06/30/2021). Chronic Effects of mTBI on Neurodegenerative Diseases. *Role*: PI (co-I: Riyi Shi, Fang Huang, Min Zhang, Chris Rochet)
- Purdue Institute for Integrative Neuroscience (07/01/2020-06/30/2021). Purdue Brain-on-a-Chip. *Role*: co-I (PI: Hugh Lee. Co-I: Aaron Bowman, Steve Wereley)
- Purdue Institute for Integrative Neuroscience (07/01/2020-06/30/2021). Elucidation of the environmental and genetic risk factors that underlie the pathogenesis of Parkinson's disease subtypes in Indiana. *Role*: co-I (PI: Jason Cannon. Co-I: Jessica Hubert, Jiaoyun Xu, Elizabeth Zauber, Ellen Wells, Sa Liu, Aaron Bowman, Min Zhang, Tamara Kinser-Ursem, Chris Rochet)

- Purdue Institute for Integrative Neuroscience (07/01/2020-06/30/2021). Biomarker discovery and validation for Parkinson's' Disease. *Role*: co-I (PI: Min Zhang. Co-I: Aaron Bowman, Christ Rochet, Dabao Zhang)
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B. Positions and Honors

Positions and Employment

2007-2009	Postdoc Researcher, Institute of Molecular Biology and Biophysics, ETH, Zürich, Switzerland
2009-2015	Assistant Professor, School of Chemical Engineering, Purdue University, West Lafayette, IN
2015-	Associate Professor, Davidson School of Chemical Engineering, Purdue University, West Lafayette, IN
2017	Visiting Scientist, Broad Institute, Boston, MA
2020	Charles Davidson Associate Professor of Chemical Engineering

Other Experience and Professional Memberships

2005-present	Member, Biophysical Society
2005-present	Member, American Physical Society
2009-present	Member, American Institute of Chemical Engineer (AIChE)
2020-present	Associate Editor, Science Advances

Honors

2016	Bravo Award, Purdue University, West Lafayette, IN
2013	CDMRP, Lung Cancer Concept Award
2006	Edna O. and William C. Hooey Prize, Cornell University, Ithaca, NY

Professional Activities:

2009-Present	Reviewer for Nucleic Acids Research, Journal of American Chemical Society, Macromolecule, Electrophoresis, Electrochimica Acta, Physical Review E, Journal of Material Chemistry, Biophysical Journal, Biosensors and Bioelectronics, Biomacromolcules
2010	Biosensor Session, Co-chair, AIChE annual meeting
2010	Panelist, National Science Foundation, Biotechnology, Biochemical and Biomass Engineering
2010-2013	Panelist, National Science Foundation, Biomedical Engineering
2011-present	Nanoscale Science Session, Co-chair/Chair, AIChE annual meeting
2012	Panelist, DOE Graduate Fellowship Program
2014	Panelist, Indiana Clinical and Translational Science Institute, Core pilot program
2014	Reviewer, Israel Science Foundation
2015-2016	Panelist, National Science Foundation, Nanobiosensing
2017-Present	Reviewer, American Association of University Women
2018	Reviewer, Medical Research Council, UK

C. Contributions to Science

1. My work at Purdue has *helped elucidate the impact of environmental chemicals on epigenome and establish the molecular mechanism accounting for long-term health implications arising from environmental exposures.* The work from our laboratory is the one of the first studies to demonstrate the physical connection between nucleosome positioning patterns and DNA methylation effects. These findings reveal the molecular mechanisms that lead to the establishment of DNA methylation patterns observed in genome-wide-association studies. We have been collaborating with Dr. Freeman to understand the impact of environmental chemical exposures on DNA methylation changes since 2015. Our joint work have identified the role of lead (Pb) and Atrazine in global DNA methylation level and DNA methyltransferase enzymatic.

a. Xie J, Lin L, Sánchez OF, Bryan C, Freeman JL, **Yuan C.** Pre-differentiation exposure to low-dose of atrazine results in persistent phenotypic changes in human neuronal cell lines. Environmental Pollution. 2021;271:116379.

b. Lin, L. F.; Xie, J.; Sánchez, O. F.; Bryan, C.; Freeman, J. L.; Yuan, C., Low dose lead exposure induces alterations on heterochromatin hallmarks persisting through SH-SY5Y cell differentiation. Chemosphere 2021, 264, 128486.
c. Sanchez OF, Lin L, Bryan CJ, Xie J, Freeman JL, Yuan C. Profiling epigenetic changes in human cell line induced by atrazine exposure. Environ Pollut. 2019:113712
d. Sara E. Wirbisky#, Oscar F. Sanchez#, Katharine A. Horzmann, Devang Thanki, Chongli Yuan, and Jennifer L. Freeman, Atrazine exposure decreases the activity of DNMTs, global DNA methylation levels, and dnmt expression, (#: equal contribution), Food and Chemical Toxicology, 2017, (17)30492-1

2. In addition to the contribution described above, my work is also focused on understanding another epigenetic modification, i.e., histone tail modification, on chromatin structure and gene regulation. Different combinations of histone tail modifications are expected to act together to determine the activity of a cell, the underlying regulation mechanisms, however, remain largely elusive. Recent work from Dr. Yuan's group has *revealed the combinatorial activities of histone tail modifications* and *established novel biophysical techniques to explore inter-chromatin interactions*.

a. Mendonca A, Sánchez OF, Xie J, Carneiro A, Lin L, Yuan C. Identifying distinct heterochromatin regions using combinatorial epigenetic probes in live cells. Biochimica et Biophysica Acta (BBA) - Gene Regulatory Mechanisms. 2021;1864(8):194725
b. Nurse, N., Yuan, C., Cis and trans internucleosomal interactions of H3 and H4 tails in tetranucleosome, Biopolymers, 2015, 103: 33
c. Nurse, N., Jimenez-Useche, I., Smith, I.T., Yuan, C., "Histone H3 and H4 tail clipping affects the nucleosome dynamics", Biophysical J., 2013:104:1-8
d. Howell, S.C., Andreson K., Jimenez, I., Yuan, C., Qiu, X., "Elucidating internucleosome interactions and the roles of histone tails", Biophysical J., 2013, 105:194-199

3. Epigenetic modifications are promising early-stage biomarkers to detect various types of diseases including cancer and neurological disorders. Sensitive detection and accurate quantification of epigenetic modifications, however, has been challenging to achieve in laboratories and hinders the applications of epigenetic markers in clinical settings. To address the current technical challenge of sensitive detection of DNA methylation and histone modifications, particularly in single cells, my group *has developed engineered protein probes to enable in situ quantification of epigenetic modification level*s.

a. Zhao, H., Ma, D., Xie, J., Sanchez, OF, Huang, F., Yuan, C., Live cell probe for in-situ single cell monitoring of mitochondrial DNA methylation, ACS sensor, 2021, accepted
b. Sanchez OF, Mendonca A, Min A, Liu J, Yuan C. Monitoring Histone Methylation (H3K9me3) Changes in Live Cells. ACS omega. 2019;4(8):13250-9.
c. Sanchez, OF., Mendonca, A., Carneiro, A.D., Yuan, C., Engineering recombinant protein sensors for quantifying histone acetylation, ACS Sensor, 2017, 2, 426-435
d. Sanchez, F.O., Williamson, D., Cai, L., Yuan, C., A sensitive protein sensor for quantifying histone acetylation levels, Talanta, 2015, 140: 212

Complete List of Published Work in My Bibliography:
http://www.ncbi.nlm.nih.gov/sites/myncbi/12irsNozrwgAK/bibliography/45321067/public/?sort=date&direction=ascending