

Xiaodong Liu, Ph.D.

POSITION TITLE Professor of Biomedical Engineering and Life Sciences

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EDUCATION **Johns Hopkins University**, Baltimore, Maryland USA

Postdoc Training, Neuroscience and Biomedical Engineering, 2004-2010

- Research Topic: “Molecular Physiology of Calcium Channels”, 7/06 ~ 6/10
- Advisor: David T. Yue, MD, PhD

- Research Topic: “Chemical Biology of Potassium Channels”, 10/04 ~ 6/06
- Advisor: Min Li, PhD

Case Western Reserve University, Cleveland, Ohio USA

Ph.D., Biomedical Engineering (Quantitative Neurophysiology), 1999-2004

- Dissertation Topic: “Signal Processing by Ion Channels in Rod Photoreceptors”

Tsinghua University, Beijing China

M.S., Biomedical Engineering, 1996-1999

Zhejiang University, Hangzhou China

B.S., Biomedical Engineering and Instrumentation, 1990-1995

with Minor in Computer Science and Engineering

PROFESSIONAL **Employment**

EXPERIENCE Professor of Biomedical Engineering, School of Medicine 8/10-Present
Professor of Life Sciences, School of Life Sciences 12/10-Present
Tsinghua University, China

Research Fellow 10/04-6/10
Johns Hopkins University, USA

Scientific Membership

Biophysical Society, Society of Neuroscience

Chinese Association for Physiological Sciences (Committee Member of Young Scientist Association)

Reviewer

Annals of Biomedical Engineering (2003-), Proceedings of National Academy of Science (2006-),
Journal of Pharmacological and Toxicological Methods (2009-), Journal of Healthcare Engineering
(2010-)

Other Services

2008 Session Chair, Gene Science, Engineering and Genomics, International Conference of Bioinformatics and Biomedical Engineering, Shanghai, China

2011 Local Committee Member, 17th International Symposium on Calcium-Binding Proteins and Calcium Function in Health and Disease (CaBP17), Beijing, China

Teaching Experience

courses

Lecturer for Section of Neurophysiology (Bio-97 Med.-Pharm. class) Spring 2011
Medical Physiology (Tsinghua University)

Lab Instructor for Engineering-School Course (undergraduate) Fall 2000 and Spring 2001
ENGR210 - Introductions to Circuits and Instruments (Case Western Reserve University)

Teaching Assistant for BME-Program Core Course (graduate) Fall 2001
EBME451 - Molecular and Cellular Physiology (Case Western Reserve University)

research

Tsinghua University Starting from 2010 Summer

Undergraduate Students

SRT (College Student Research Training Plan): HAN Hao and WANG Shuyu

Thesis research: LV Shuna and PIAN Bing

PhD student: LIU Nan

MS student: TANG Ji, JIANG Peng

Mentoring of Undergraduate Research (*Vincent Wu*, Johns Hopkins University) 2007-2008

HONORS AND AWARDS

Research Grant 81171382 from National Natural Science Foundation of China 2011

Key Faculty Support Plan, Tsinghua University, 2010

Whitaker Student Registration Grant, IEEE-EMBS, 2004

Student Mentorship Award, School of Graduate Studies, Case Western Reserve University 2004

Student Travel Award, Biomedical Engineering Society, 2003

Whitaker Foundation Traineeship, BME Department, Case Western Reserve University, 1999-2000

GuangHua Scholarship, Tsinghua University, 1998

Student Research Award, Zhejiang University, 1994

Excellent Student Scholarship, Zhejiang University, 1990-1994

Journal Articles

1. Wang P, Li R, Lin L and *Liu XD* (1998) Study on flexible neural network for odor recognition of electronic nose. **Pattern Recognition and Artificial Intelligence**, Vol. 4, 1998.
2. Kourennyi DE, *Liu XD* and Barnes S (2002) Modulation of rod photoreceptor potassium Kx current by divalent cations. **Annals of Biomedical Engineering** 30: 1196-1203. (selected by *Vir. J. Bio. Phys. Res. (2002) 4:11/MEMBRANE BIOPHYSICS*)
3. Kourennyi DE, *Liu XD*, Hart J, Mahmud F, Baldrige WH and Barnes S (2004). Reciprocal modulation of calcium dynamics at rod and cone photoreceptor synapses by nitric oxide. **Journal of Neurophysiology** 92: 477-83.
4. *Liu XD* and Kourennyi DE (2004) Effect of TEA on Kx channels and simulated light response in rod photoreceptors. **Annals of Biomedical Engineering** 32: 1428-42.
5. Sun H, *Liu XD*, Xiong Q, Shikano S and Li M (2006) Chronic inhibition of cardiac Kir2.1 and hERG potassium channels by celastrol with dual effects on both ion conductivity and protein trafficking. **Journal of Biological Chemistry** 281: 5877-5884. (selected as *Cover Story*)
6. Chen P, *Liu XD*, Wang B, Cheng G and Ping Wang (2009) A biomimetic taste receptor cell-based biosensor for electrophysiology recording and acidic sensation, **Sensors and Actuators, B: Chemical** 139: 576-583.
7. Chen P, *Liu XD*, Zhang W, Zhou J, Wang P, Yang W, and Luo J (2009) Modeling and simulation of ion channels and action potentials in taste receptor neurons, **Science China C Life Science** 11:1036-47. (Chinese Translation Published on 39: 149-160)
8. *Liu XD*, Yang PS, Yang W and Yue DT (2010) Enzyme-inhibitor-like tuning of Ca²⁺ channel connectivity with calmodulin, **Nature** 463: 968-972. (selected as Editor's Choice *Science Signaling*: N. R. Gough, Quantifying Interactions. *Sci. Signal.* 3, ec62 (2010); selected by *Faculty of 1000*, F1000.com/2389956 (2010))
9. Chen P[#], Yang W[#], Xu Y, Wang P, Luo J, Zhao J and *Liu XD*^{*} (*in submission*) PKDL channels of TRPP family with proton- and calcium-dependent inhibition in sensing the offset of acid stimuli. (#equal contribution, *corresponding author)
10. *Liu XD*, Sun H and Li M (*in preparation*) A novel family of M-channel potentiators.

International Conference Proceedings

1. *Liu XD* and Kourennyi DE (2004) Linear system analysis of ion channel modulation in rod photoreceptors under dim light conditions. Annual International Conference of the IEEE Engineering in Medicine and Biology - Proceedings, v 26 VI: 4037-40.
2. Chen P, Cheng G, Wang B, Wang P^{*} and *Liu XD*^{*} (2008) Design of a novel acid-sensing biosensor based on taste neurons and LAPS. In: 2nd International Conference on Bioinformatics and Biomedical Engineering, iCBBE 2008, pp 1561-1564 (*corresponding authors)

Conference Abstracts

1. *Liu XD* and Kourennyi DE (2000) Modeling of effects of zinc on salamander rod photoreceptor potassium Kx current. *Annals. Biomed. Eng.* 28:S114.
2. *Liu XD* and Kourennyi DE (2001) Development of a microscopic electrochemical sensor for nitric oxide. *Annals Biomed. Eng.* 29:S131.
3. Kourennyi DE, *Liu XD* (2001) Effects of nitric oxide on photoreceptor light response: modeling

study. Invest. Ophthalmol. Vis. Sci. 42:S369.

4. *Liu XD* and Kourennyi DE (2003) Concentration dependent effects of nitric oxide on rod photoreceptors. Invest. Ophthalmol. Vis. Sci. 44:S4160.
5. Kourennyi DE and *Liu XD* (2003) Effect of TEA on Kx channels and simulated light response in rod photoreceptors. BMES.
6. *Liu XD*, Ulatowski L and Kourennyi DE (2003) Simulation of the Light Response in Patch Clamp Recordings from Photoreceptors. BMES.
7. *Liu XD* and Kourennyi DE (2003) Nitric Oxide effects on simulated light response of photoreceptors. BMES.
8. *Liu XD* and Kourennyi DE (2004) D-S-Nitrosocysteine inhibits the calcium channels in rod photoreceptors. Invest Ophthalmol Vis Sci. 45:S1340.
9. *Liu XD*, Sun H and Li M (2007). A Novel Family of KCNQ/M Channel Potentiators Discovered by Compound Screening. Biophysical Society Annual Meeting.
10. *Liu XD*, Yang PS and Yue DT (2008). Modulation of L-type Ca Channels by the Distal C-terminal of $\text{Ca}_V1.4$: Simultaneous Effects on Ca^{2+} -dependent Inactivation and Voltage-dependent Activation. Biophysical Society Annual Meeting.
11. Chen P, Yang W, Wang P, Luo J and *Liu XD* (2008) Temporal encoding of sour taste by ASIC and PKDL: a computational study, Society of Neuroscience Annual Meeting.
12. *Liu XD*, Yang PS, Wu V and Yue DT (2009), $\text{Ca}_V1.4$ C-tail Segment (ICDI) Inhibits Ca_V Channel Inactivation by Competing with Calmodulin-Resolution by Holochannels and Calmodulin FRET Sensors, Biophysical Society Annual Meeting.
13. *Liu XD*, Yang PS, Wu V, Yang W and Yue DT (2009), The distal carboxy tail of Ca^{2+} channels retunes their calmodulin sensitivity into the neurobiological range, Society of Neuroscience Annual Meeting.
14. Chen P, Yang W, Wang P, Luo J, Zhao J and *Liu XD* (2009), PKDL channels of TRPP family sensing the offset of acid stimuli, Society of Neuroscience Annual Meeting.
15. *Liu XD*, Yang PS, Yang W and Yue DT (2010), Enzyme-inhibitor-like tuning of calcium channel connectivity with calmodulin, Biophysical Society Annual Meeting.
16. Liu Q, Xie X, Zhang Y, Xu Y, Zhang Y, Liu X, Bai J and *Liu XD* (2011), Characterization of quantitative FRET sensors for fluorescence molecular tomography, Biophysical Society Annual Meeting.

Book Chapter

Liu XD and Bai J. Medical Information System for Telemedicine. Chapter 7 in Introduction to Telemedicine, 2000, Tsinghua University Press, ISBN:7302040494

PRESENTATIONS AND TALKS

1. Modeling of effect of nitric oxide on photoreceptor light response. Canadian Physiological Society Annual Meeting, Mont Tremblant, Canada, January 2001.
2. Nitric oxide effects on simulated light response of photoreceptors. Biomedical Engineering Society Annual Meeting, Nashville, TN, October 2003.
3. Modulation of ion channels in photoreceptors. Neurological Sciences Institute, OSHU, Portland, OR August 2004.
4. Chemical modulation of K^+ channels. Retina Group, University of Pennsylvania, Philadelphia, PA March 2006.

5. Modulation of ion channels: pharmacological and genetic perturbation of membrane excitability. Department of Biomedical Engineering, Zhejiang University, Hangzhou, China May 2008.
6. Distal carboxy tails and apoCaM vie for Ca channels. Center of Cell Dynamics, Johns Hopkins University, Baltimore, MD May 2009.
7. Tuning calcium channels with tails and calmodulin: convergence meets divergence. Physiology Department, University of Texas Southwestern Medical Center, Dallas, TX January 2010
8. Enzyme-inhibitor-like tuning of calcium channel connectivity with calmodulin. Biophysical Society 54th Annual Meeting, San Francisco, CA February 2010
9. Sensing with ion channels. Department of Biomedical Engineering, Tsinghua University, Beijing, China March 2010
10. Competitive tuning of calcium dependent inactivation: an inspiration from calcium channels in sensory receptors. School of Medicine, Zhejiang University, Hangzhou, China March 2010
11. A tale of tails: tuning Ca^{2+} channels by competing with calmodulin. School of Life Sciences, Peking University, Beijing, China March 2010
12. Genetically encoded FRET sensors in discovering convergent mechanisms of Ca^{2+} channels in live cells. 1st Sino-America Advanced Sensors and Bio-Inspired Technologies Workshop, Shanghai, China November 2010
13. A tale of tails: a convergent modulation of Ca^{2+} channels by diverse termini. School of Life Sciences, Tsinghua University. December 2010
14. Sensory and transmembrane signaling by ion channels. School of Aerospace, Tsinghua University. December 2010

REFERENCES

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