

教师介绍

栗大超

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姓名	栗大超	
职称	教授	
所在系别	精密仪器工程系	
行政职务	院长助理	
所属课题组	生物微流体与生物传感技术	
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主讲课程	本科：《电路、信号与系统》 研究生：《现代传感技术》	
导师类型	仪器科学与技术——博导、硕导	

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个人经历学历学术经历

2016年9月至今，天津大学，精密仪器工程系，长聘教授
2014年7月至今，天津大学，精密仪器工程系，教授
2013年11月至今，天津大学，精密仪器工程系，博士生导师
2006年7月至2014年6月，天津大学，精密仪器工程系，副教授
2006年9月至2008年8月，美国CWRU大学，电子工程与计算机科学系，博士后
2004年7月至2006年6月，北京大学，微电子学研究所，博士后
2004年4月至2006年6月，天津大学，精密仪器工程系，讲师
1998年9月至2004年3月，天津大学，精密仪器及机械专业，博士
1994年9月至1998年6月，天津大学，精密仪器专业，本科

研究方向

从事生物信息检测技术及仪器领域的研究工作，包括光微流体、声微流体、电化学传感、超声微器件、高性能传感器、微量打印微制造等。近年来，系统开展了生物微流体与生物传感技术在血糖连续监测中的应用研究。

科研项目、成果和专利

(一) 代表性的科研项目（主持）：

1. 国家自然科学基金面上项目，基于石墨烯-金纳米颗粒修饰的亲型和表面等离子共振葡萄糖传感器，2016/01-2019/12，负责人
2. 天津市自然科学基金重点项目，金纳米颗粒修饰的亲型和表面等离子共振葡萄糖传感器，2016/01-2018/12，负责人
3. 国家自然科学基金海外及港澳学者合作研究基金项目，用于葡萄糖连续检测的亲型和石墨烯纳米传感器，2015/1-2016/12，中方负责人
4. 国家自然科学基金外园青年学者研究基金项目， Developments in Additive Microfabrication using Inkjet Printed Gold on Cylindrical Substrates, 2013/7-2014/6，中方负责人
5. 国家自然科学基金面上项目，细胞间液透皮抽取式血糖连续检测芯片的研究，2012/01-2015/12，负责人
6. 国家863计划项目子课题，微创血糖连续检测及胰岛素注入系统的研制，2012/11-2016/10，负责人
7. 天津市科技支撑计划重点项目，组织液透皮抽取式人体血糖微创检测技术及仪器，2011/04-2014/03，负责人
8. 国家自然科学基金面上项目，基于石墨烯-金纳米颗粒修饰的亲型和表面等离子共振葡萄糖传感器，2016/01-2019/12，负责人
9. 教育部促进与美大地区国际合作与高层次人才培养项目，基于纳流技术的连续血糖检测方法及芯片研究，2011/01-2012/12，负责人
10. 国家自然科学基金青年教师基金项目，基于人体组织液透皮抽取和分析的微创血糖检测技术，2008/01-2010/12，负责人
11. 天津市自然科学基金项目，非采血式人体血糖浓度的微创检测技术研究，2007/04-2010/03，6万元，负责人

(二) 代表性的国家发明专利（已授权）：

1. 基于周期性金属纳米结构修饰的光纤局域表面等离子共振传感器；栗大超，杨获，徐可欣；2014106100732
2. 具有温度自补偿的光纤表面等离子共振葡萄糖传感器；栗大超，伍鹏，朱庆，杨佳，徐可欣；2011103257540
3. 基于光纤表面等离子共振的人体葡萄糖浓度连续监测系统；栗大超，伍鹏，刘向坤，徐可欣；2010101534008
4. 基于光纤衰减全反射的植入式人体血糖浓度连续监测系统；栗大超，余松林，傅泉英，徐可欣；2010105067527
5. 基于微量采血的人体血糖浓度的连续高精度检测仪器；栗大超，伍鹏，王日东，徐可欣；2012103644849
6. 微型化、动态可控的组织液透皮抽取和收集装置；栗大超，于海鹏，徐可欣；2010100313559
7. 基于石墨烯纳米颗粒增强的压扁型光纤ATR葡萄糖传感器；栗大超，孙长月，王日东，王东昂，徐可欣；2014101134390
8. 微量组织液抽取、收集、输送和计量的一体化装置；栗大超，孙磊，徐可欣；2009100688063
9. 人体血糖浓度的微创、动态、连续检测系统；徐可欣，栗大超，黄显，于海鹏，张增增；2006100132491
10. 人体组织液成分含量传感器、流体通道单元及其检测方法；徐可欣，栗大超；2008100579358
11. SENSOR AND METHOD FOR MEASURING AMOUNT OF ANALYTE IN HUMAN INTERSTITIAL FLUID, FLUID CHANNEL UNIT; Kexin Xu, Dachao L; US 86796408 A
12. 人体组织液成分含量有量センサ、流体通路ユニット及びその検出方法；徐可欣；栗大超；2010547027

(三) 国际合作研究与学生培养：

“生物微流体与生物传感技术课题组”高度重视国际合作与交流，已与美国和香港地区的6所世界知名大学建立了密切、深入的科研合作，包括：

- (1) 美国Columbia University机械工程系；
- (2) 美国Case Western Reserve University电子工程与计算机科学系；
- (3) 美国University of South Carolina化学与生物化学系；
- (4) 美国UCLA分子生物学系；
- (5) 香港科技大学机械工程系；
- (6) 香港大学电子工程与计算机科学系。

近五年来，课题组已派出2名博士生赴美国UCLA大学和CWRU大学联合培养、1名硕士生赴香港大学联合培养、7名学生赴美国哥伦比亚大学（3人）和CWRU大学（4人）攻读博士学位。多名本科生赴海外开展毕业设计工作。

论文、专著

(一) 近五年的代表性国际期刊论文（第一作者或通讯作者）：

- [1] Zhilua Pu, Ridong Wang, Jianwei Wu, Haixia Yu, Kexin Xu and **Dachao Li**, A flexible electrochemical glucose sensor with composite nanostructured surface on the working electrode, *Sensors and Actuators B: Chemical*, 2016, 213: 801-809
- [2] **Dachao Li**, Bingyu Lu, Rui Zhu, Haixia Yu, and Kexin Xu, An optofluidic system with volume measurement and surface plasmon resonance sensor for continuous glucose monitoring, *Biomicrofluidics*, 2016, 10 (1): 011913 (10 pages)
- [3] Zhilua Pu, Chongwei Zou, Ridong Wang, Xiaochen Lai, Haixia Yu, Kexin Xu, and **Dachao Li**, A continuous glucose monitoring device by graphene modified electrochemical sensor in microfluidic system, *Biomicrofluidics*, 2016, 10(1): 011910 (10 pages)
- [4] Jianwei Wu, Ridong Wang, Haixia Yu, Guojun Li, Kexin Xu, Norman C. Tien, Robert C. Roberts, **Dachao Li**, Inkjet-Printed Microelectrodes on PDMS as Biosensors for Functionalized Microfluidic Systems, *Lab on a Chip*, 2015, 15: 690-695
- [5] **Dachao Li**, Songlin Yu, Changyue Sun, Chongwei Zou, Haixia Yu, Kexin Xu, U-shaped fiber-optic ATR sensor enhanced by silver nanoparticles for continuous glucose monitoring, *Biosensors and Bioelectronics*, 2015, 72: 370-375
- [6] **Dachao Li**, Jianwei Wu, Peng Wu, Yuan Lin, Yingjuan Sun, Yang Jia, Kexin Xu, Affinity Based Glucose Measurement Using Fiber Optic Surface Plasmon Resonance Sensor with Surface Modification by Borate Polymer, *Sensors & Actuators B: Chemical*, 2015, 215: 295-304
- [7] **Dachao Li**, Yanwen Sun, Songlin Yu, Changyue Sun, Haixia Yu, Kexin Xu, A single-loop fiber attenuated total reflection sensor enhanced by silver nanoparticles for continuous glucose monitoring, *Sensors and Actuators B: Chemical*, 2015, 220: 1033-1042
- [8] **Dachao Li**, Di Yang, Yang Jia, Yuan Lin, Yingjuan Sun, Haixia Yu, Kexin Xu, Glucose Affinity Measurement by Surface Plasmon Resonance with Borate Polymer Binding, *Sensors and Actuators A: Physical*, 2015, 222: 58-66
- [9] **Dachao Li**, Zhilua Pu, Wenshuai Liang, Tongkun Liu, Ridong Wang, Haixia Yu, Kexin Xu, Non-invasive Measurement of Normal Skin Impedance for Determining the Volume of the Transdermally Extracted Interstitial Fluid, *Measurement*, 2015, 62: 215-221
- [10] Songlin Yu, **Dachao Li**, Hao Chong, Changyue Sun, Haixia Yu, Kexin Xu, In Vitro Glucose Measurement Using Tunable Mid-Infrared Laser Spectroscopy Combined with Fiber-Optic Sensor, *Biomedical Optics Express*, 2014, 5(1): 275-286
- [11] **Dachao Li**, Xiaoli Zhang, Rui Zhu, Peng Wu, Haixia Yu, Kexin Xu, A Method to Detect the Mixed Petrol Interface by Refractive Index Measurement With a Fiber-Optic SPR Sensor, *IEEE Sensors Journal*, 2014, 14(10): 3701-3707
- [12] **Dachao Li**, Ridong Wang, Haixia Yu, Guoqing Li, Yue Sun, Wenshuai Liang, Kexin Xu, A Method for Measuring the Volume of Transdermally Extracted Interstitial Fluid by a Three-Electrode Skin Resistance Sensor, *Sensors*, 2014, 14: 7084-7095
- [13] Haixia Yu, **Dachao Li**, Yongjie Ji, Xiaoli Zhang, Kexin Xu, An Interstitial fluid transdermal extraction chip with vacuum generator and volume sensor for continuous glucose monitoring, *Key Engineering Materials*, 2013, 562-565: 571-575
- [14] Songlin Yu, **Dachao Li**, Hao Chong, Changyue Sun, Kexin Xu, Continuous Glucose Determination Using Fiber-Based Tunable Mid-Infrared Laser Spectroscopy, *Optics and Lasers in Engineering*, 2014, 55: 78-83
- [15] Ting Shi, **Dachao Li**, Guoqing Li, Yuan Lin, Kexin Xu, Luo Lu, Development of a Fluorescent Method for Simultaneous Measurement of Glucose Concentrations in Interstitial Fluid and Blood, *Measurement Science and Technology*, 2013, 24(12): 125701
- [16] Haixia Yu, **Dachao Li**, Robert C. Roberts, Kexin Xu, Norman C. Tien, A Micro-PDMS Flow Sensor Based on Time-of-Flight Measurement for Conductive Liquid, *Microsystem Technologies*, 2013, 19(7): 989-994
- [17] Haixia Yu, **Dachao Li**, Robert C. Roberts, Kexin Xu, Norman C. Tien, An Interstitial Fluid Transdermal Extraction System for Continuous Glucose Monitoring, *Journal of Microelectromechanical Systems*, 2012, 21(4): 917-925
- [18] Haixia Yu, **Dachao Li**, Robert C. Roberts, Kexin Xu, Norman C. Tien, Design, Fabrication and Testing of a Micro-Venturi Tube for Fluid Manipulation in a Microfluidic System, *Journal of Micromechanics and Microengineering*, 2012, 22(3): 035010 (9pp)
- [19] Haixia Yu, **Dachao Li**, Robert C. Roberts, Kexin Xu, Norman C. Tien, A Time-of-Flight Flow Sensor for the Volume Measurement of Trace Amount of Interstitial Fluid, *Journal of Micromechanics and Microengineering*, 2012, 22(5): 055009 (7pp)

(二) 近五年的代表性国际会议论文（第一作者或通讯作者）：

- [1] B. Lu, X. Lai, P. Zhang, H. Wu, and D. Li, "Roughened Cylindrical Gold Layer With Curve Graphene Coating For Enhanced Sensitivity of Fiber SPR Sensor", *IEEE Int. Conf. Solid-State Sensors, Actuators and Microsystems (Transducers ' 17)*, June 18-22, 2017, Kaohsiung, Taiwan.
- [2] X. Lai, B. Lu, H. Wu, Z. Pu, H. Yu, and D. Li, "A Novel Method for Generating Monodispersed Droplet Array by Inkjet-Patterned Hydrophilic Symbols for Controlled Reactions", *IEEE Int. Conf. Solid-State Sensors, Actuators and Microsystems (Transducers ' 17)*, June 18-22, 2017, Kaohsiung, Taiwan.
- [3] Z. Pu, X. Zhang, H. Wu, H. Yu, and D. Li, "Cylindrical Electrochemical Sensor Fabricated by Rotated Inkjet Printing on Flexible Substrate for Glucose Monitoring", *IEEE Int. Conf. Solid-State Sensors, Actuators and Microsystems (Transducers ' 17)*, June 18-22, 2017, Kaohsiung, Taiwan.
- [4] Bingyu Lu, Yanwen Sun, Xiaochen Lai, Zhilua Pu, Haixia Yu, Kexin Xu and **Dachao Li**, Side-polished Fiber SPR Sensor with Temperature Self-compensation for Continuous Glucose Monitoring, *The 29th IEEE International Conference on Micro Electro Mechanical Systems (MEMS 2016)*, 24-28 January, 2016, Shanghai, China.
- [5] Chongwei Zou, Chengtao Sun, Haixia Yu, Kexin Xu and **Dachao Li**, Continuous glucose monitoring system based on enzyme colorimetry sensor and microfluidic chip, *The 9th International Conference on Advanced Technologies & Treatments for Diabetes(ATTD 2016)*, February 3-6, 2016, Milan, Italy.
- [6] **Dachao Li**, Changyue Sun, Haixia Yu, Kexin Xu, Fabrication of Silver Nanoparticles on Cylindrical Surface of U-Shaped Fiber ATR Sensor by Material Reduction, *The 28th IEEE International Conference on Micro Electro Mechanical Systems (MEMS 2015)*, January 18-22, 2015, Estoril, Portugal.
- [7] **Dachao Li**, Ridong Wang, Zhilua Pu, Haixia Yu, Kexin Xu, A Gold Nanoparticles-based Electrochemical Sensor in Microfluidic for Continuous Glucose Monitoring, *The 8th International Conference on Advanced Technologies & Treatments for Diabetes (ATTD 2015)*, February 18-21, 2015, Paris, France.
- [8] **Dachao Li**, Jianwei Wu, Peng Wu, Yuan Lin, Yingjuan Sun, Rui Zhu, Jia Yang, Kexin Xu, Glucose Measurement Using Surface Plasmon Resonance Sensor with Affinity Based Surface Modification by Borate Polymer, *The 18th International Conference on Solid-State Sensors, Actuators and Microsystems (Transducers 2015)*, June 21-25, 2015, Alaska, USA.
- [9] **Dachao Li**, Haixia Yu, Songlin Yu, Peng Wu, Ting Shi, Glucose Continuous Monitoring in Interstitial Fluid by Microfluidic, *The 5th International Conference on Optofluidics (Optofluidics 2015)*, 26-29 July, 2015, Taipei, Taiwan.
- [10] Zhilua Pu, Ridong Wang, Haixia Yu, Kexin Xu, **Dachao Li**, A Wearable Continuous Glucose Monitoring System with Electrochemical Sensor Modified by Graphene, *The 19th International Conference on Miniaturized Systems for Chemistry and Life Science (MicroTAS 2015)*, October 25-29, 2015, Gyeongju, Korea.
- [11] Changyue Sun, Yuzhen Cao, Yanwen Sun, Songlin Yu, Haixia Yu, **Dachao Li**, Flattened Fiber ATR Sensor Enhanced by Silver Nanoparticles for Continuous Glucose Monitoring, *The 19th International Conference on Miniaturized Systems for Chemistry and Life Science (MicroTAS 2015)*, October 25-29, 2015, Gyeongju, Korea.
- [12] Chongwei Zou, Chengtao Sun, Haixia Yu, Kexin Xu, **Dachao Li**, An Optofluidic System based on Enzyme Colorimetry for Continuous Glucose Monitoring, *The 19th International Conference on Miniaturized Systems for Chemistry and Life Science (MicroTAS 2015)*, October 25-29, 2015, Gyeongju, Korea.
- [13] Zhilua Pu, Ridong Wang, Haixia Yu, Kexin Xu, **Dachao Li**, A Flexible Electrochemical Sensor Modified by Graphene and AuNPs for Continuous Glucose Monitoring, *The 14th IEEE SENSORS Conference (IEEE Sensors 2015)*, November 1-4, 2015, Busan, Korea.
- [14] Yanwen Sun, Changyue Sun, Songlin Yu, Haixia Yu, **Dachao Li**, Single-Loop Fiber ATR Sensor Enhanced by Silver Nanoparticles for Continuous Glucose Monitoring, *The 14th IEEE SENSORS Conference (IEEE Sensors 2015)*, November 1-4, 2015, Busan, Korea.
- [15] **Dachao Li**, Ridong Wang, Zhilua Pu, Haixia Yu, Kexin Xu, A Gold Nanoparticles-based Electrochemical Sensor in Microfluidic for Continuous Glucose Monitoring, *Advances in Microfluidics and Nanofluidics 2014 Meeting (AMN2014)*, May 19 to 24, 2014, Taipei, Taiwan.
- [16] Jianwei Wu, Robert C. Roberts, Norman C. Tien, **Dachao Li**, Inkjet Printed Silver Patterning on PDMS to Fabricate Microelectrodes for Microfluidic Sensing, *The 13th IEEE Conference on Sensors (IEEE Sensors 2014)*, November 2-5, 2014, Valencia, Spain.
- [17] Jianwei Wu, Robert C. Roberts, Norman C. Tien, **Dachao Li**, Inkjet Printed Microelectrode on PDMS for Manufacturing a Microfluidic Biosensing System, *The 4th International Conference on Optofluidics (Optofluidics 2014)*, August 28-30, 2014, Guangzhou, China.
- [18] **Dachao Li** and Kexin Xu, Minimally Invasive Glucose Measurement based on Interstitial Fluid Extracted Transdermally, *Biomedical Engineering Suzhou International Symposium (BMESIS 2014)*, April 8-10, 2014, Suzhou, China
- [19] Songlin Yu, **Dachao Li**, Changyue Sun, Haixia Yu, Kexin Xu, Silver-nanoparticle-enhanced bent fiber-optic ATR sensor combined with tunable mid-infrared laser for glucose measurement, *7th Asia-Pacific Conference on Transducers and Micro/Nano Technologies (APCOT 2014)*, June 29 - July 2, 2014, Daegu, Korea.
- [20] Jianwei Wu, Robert C. Roberts, Norman C. Tien, **Dachao Li**, Inkjet Printed Multimetal Microelectrodes on PDMS for Functionalized Microfluidic Systems, *The 18th International Conference on Miniaturized Systems for Chemistry and Life Sciences (MicroTAS 2014)*, October 26-30, 2014, San Antonio, USA.
- [21] **Dachao Li**, Haixia Yu, Jianwei Wu, Di Yang, Yuan Lin, Qian Wang, Kexin Xu, An Optical Lab-on-a-Chip System Based on SPR Sensor for Continuous Glucose Monitoring, *The 17th International Conference on Miniaturized Systems for Chemistry and Life Sciences (MicroTAS 2013)*, October 27-31, 2013, Freiburg, Germany.
- [22] **Dachao Li**, Haixia Yu, Xian Huang, Bing Song, Yuan Jia, Yongjie Ji, Kexin Xu, Qiao Lin, A Microfluidic System with Volume Sensor and Dielectric Glucose Sensor for Continuous Glucose Monitoring, *The 17th International Conference on Solid-State Sensors, Actuators and Microsystems (Transducers 2013)*, June 16-20, 2013, Barcelona, Spain.
- [23] **Dachao Li**, Rui Zhu, Peng Wu, Jianwei Wu, Kexin Xu, Measurement of Glucose Concentration by Fiber-Optic Surface Plasmon Resonance Sensor, *SPIE Photonics West 2013*, February 2-7, 2013, San Francisco, USA.
- [24] **Dachao Li**, Yang Jia, Peng Wu, Di Yang, Bo Wang, Yuan Lin, Kexin Xu, Glucose Measurement by Surface Plasmon Resonance with Borate Polymer Binding, *SPIE Photonics West 2013*, February 2-7, 2013, San Francisco, USA.
- [25] **Dachao Li**, Ridong Wang, Hao Chong, Liu Yu, Kexin Xu, Glucose Measurement in Interstitial Fluid by Microdialysis for the Calibration of Minimally Invasive Blood Glucose Monitoring, *SPIE Photonics West 2013*, February 2-7, 2013, San Francisco, USA.
- [26] Songlin Yu, **Dachao Li**, Kexin Xu, Tunable Mid-Infrared Laser Spectroscopy for Glucose Measurement, *Conference on Laser Surgery and Medicine 2012 (CLSM 2012)*, April 25-27, 2012, Yokohama, Japan.
- [27] **Dachao Li**, Peng Wu, Jia Yang, Rui Zhu, Kexin Xu, An Implantable Fiber-optic Surface Plasmon Resonance Glucose Sensor based on TFBG, *Conference on laser surgery and medicine 2012 (CLSM 2012)*, April 25-27, 2012, Yokohama, Japan.
- [28] **Dachao Li**, Peng Wu, Rui Zhu, Yang Jia, Haixia Yu, Kexin Xu, Implantable Fiber-optic SPR Sensor Modified with LPFG and PAA-ran-PAAPBA for Continuous Glucose Monitoring, *The 11th IEEE Sensors Conference (IEEE Sensors 2012)*, October 28-31, 2012, Taipei, Taiwan.
- [29] **Dachao Li**, Rui Zhu, Peng Wu, Yang Jia, Kexin Xu, An Implantable Fiber-Optic Surface Resonance Glucose Sensor Based on LPFG, *SPIE Photonics West 2012*, January 22-26, 2012, San Francisco, USA.
- [30] Ting Shi, **Dachao Li**, Yongjie Ji, Guoqing Li, Kexin Xu, Modeling of Relationship between Glucose Concentration in Blood and Glucose Concentration in Interstitial Fluid, *SPIE Photonics West 2012*, January 22-26, 2012, San Francisco, USA.
- [31] Haixia Yu, **Dachao Li**, Yongjie Ji, Xiaoli Zhang, Kexin Xu, An Interstitial Fluid Transdermal Extraction Chip with Vacuum Generator and Volume Sensor for Continuous Glucose Monitoring, *The 14th Annual Conference of the Chinese Society of Micro/Nano Technology (CSMNT 2012)*, November 4-7, 2012, Hangzhou, China.

奖励、荣誉和学术兼职

- 2013年入选教育部“新世纪优秀人才支持计划”；
- 2014年获“教育技术发明一等奖”；
- 2015年入选天津大学“北洋青年学者支持计划”；
- 中国高等教育学会测拉技术专业委员会委员；
- 天津市便携式医疗设备专业委员会学术委员会委员。

科技链接



教学链接



校内链接

