

# *Curriculum Vitae*

## **Dr. Xu (Shine) Zhang**

Research Chair in Applied Nanotechnology  
Verschuren Centre for Sustainability in Energy and the Environment  
Cape Breton University  
1250 Grand Lake Rd, Sydney, Nova Scotia, Canada

## ***Research Interest***

### **1. Nanomedicine**

- Development nanostructured materials for drug delivery, imaging and molecular diagnostics
- Cancer treatment (Nanomaterials based Chemotherapy and Radiation Therapy)
- Fundamental research on interfacing nanomaterials to biomolecules and pharmaceuticals.

### **2. Emulsion based Microfluidic Technologies**

- Coating technology based on emulsions generated by microfluidic technology
- Medical materials fabricated with microfluidic technology
- High throughput screening for bio-particles

### **3. Nanotechnology for energy & the environmental**

- Nanotoxicity of engineered nanomaterials
- Nanomaterials based catalyst for water treatment and energy
- Development of nanosensor technology for environmental monitoring
- Anti-bacteria nanomaterials.
- Investigation of the environmental and health impact of industrial nanomaterials

## ***Employment***

**2014.7-** **Industrial Research Chair of Applied Nanotechnology.** Verschuren Centre for Sustainability in Energy and the Environment, Cape Breton University.

**Adjunct faculty.** Department of Biology, University of Waterloo; Department of Chemistry, Cape Breton University.

**2013.9-2014.6** **Research Fellow.** Verschuren Centre for Sustainability in Energy and the Environment, Cape Breton University.

**2002.2-2004.12** **Lecturer/Assistant Prof.** Faculty of Life Science, Sichuan Agricultural University, China

**1999.9-2002.1** **Research Engineer.** National Engineering Centre for Biochip Technology, Beijing, China.

**Research Project:** Design/fabrication of microfluidic sample-preparation chip with magnetic nanoparticles for DNA extraction.

**Outcome:** Four patents and 2 publications.

**1995.9-1999.7** **Research Assistant.** Faculty of Life Science, Sichuan Agricultural University, China

## ***Education***

- 2009.3-2013.8 Postdoctoral training:** Collaborative training at the Univ. of Waterloo and Harvard University.
- 2005.1-2009.2 Doctoral studies.** Department of Chemistry, University of Waterloo.
- 1995.9-1998.7 Master of Science: Biophysics.** Isotope Research Lab, Sichuan Agricultural University.
- 1991.9-1995.7 Bachelor of Agriculture.** Institute of Animal Nutrition Science, the National Key Discipline, Sichuan Agricultural University.

## ***Professional Affiliation***

- 2014.2-2017.1** Membership in the Beatrice Hunter Cancer Research Institute (Associate member)

## ***Recent Honors and Awards***

2016. 4 NSERC Discovery Grants Program: **Engineering Graphene Oxide based Nanocomposite Paints against Marine Biofouling.**
- 2015.9 Beatrice Hunter Cancer Research Institute New Investigator Award 2015.
- 2015.8 On the 30th Anniversary of the ACS journal “*Langmuir*”, which is the best journal for surface and colloids science, my first-author paper “The Surface Science of DNA Adsorption onto Citrate-Capped Gold Nanoparticles” that published in 2012 was selected as one of “***the most influential Langmuir articles published over its history***” (40 papers were selected in its Virtual Issue from > 40,000 published Langmuir papers since 1985). See the Links:  
  
<https://uwaterloo.ca/biology/news/waterloos-golden-touch-scientists-research-paper-selected>  
  
<http://pubs.acs.org/page/langd5/30-Anniversary?hootPostID=ce75d0fcc7c552746f6a8fab582eb9be>
- 2015.7** 2015-16 Nova Scotia Health Research Foundation (NSHRF) Development/ Innovative Grant
- 2015.7** New PI Award of Careers in Cancer Research Development Program (CCRDP), Sponsored by Canadian Institutes of Health Research - ICR and the Canadian Cancer Society Research Institute
- 2015.6** Monthly Featured Researcher highlighted by Beatrice Hunter Cancer Research Institute in June, 2015 (<http://bhcri.ca/> and <http://bhcri.ca/dr.-shine-xu-zhang>).
- 2014.6** Research Chair in Applied Nanotechnology.

- 2011.5** Fellowship by Canadian Institutes of Health Research (3 years, ranked top 1.5% candidate over Canada).
- 2010.5** Fellowship by the Ontario Ministry of Research and Innovation (50 K Canadian dollars).

### ***Honors and Awards for my current students***

- 2016.4** Canadian Institutes of Health Research- – Frederick Banting and Charles Best Canada Graduate Scholarship – Master’s (CGS-M) for Bruce MacDonald, my MSc student (National, \$17,500/year Canadian dollars for 2016-2017)
- 2016.4** Craig's Cause Pancreatic Cancer Society/BHCRI Traineeship for Breast Cancer Research for Dennis Curry (Provisional, \$8925/year Canadian dollars for 2016-2018)
- 2016.3** BHCRI Studentship Award for Kori Andrea (\$6.5K)
- 2016.3** NSERC Undergraduate Student Research Award for Kori Andrea (*Declined*)
- 2015.5** Canadian Institutes of Health Research- – Frederick Banting and Charles Best Canada Graduate Scholarship – Master’s (CGS-M) for Dennis Curry, my MSc student (National, \$17,500/year Canadian dollars for 2015-2016)
- 2015.4** Breast Cancer Society of Canada/QEII Foundation/BHCRI Traineeship for Breast Cancer Research for Dennis Curry (Provisional, \$8925/year Canadian dollars for 2015-2016)
- 2015.3** Ontario Graduate student Fellowship for Dennis Curry (Provisional, 15K/year Canadian dollars). *Declined*.
- 2015.3** University Waterloo President Scholarship for Dennis Curry (University level. 10K/year Canadian dollars)
- 2015.2** 2014-15 Scotia Scholars<sup>OM</sup> (Undergrad) scholarship for Hope Scheller (5K Canadian dollars)

### **Current group members:**

Prof. Mingsheng Lu (Visiting professor from Huaihai Institute of Technology. 2014.6-2016.5)

Prof. Shujun Wang (Visiting professor from Huaihai Institute of Technology. 2015.9-2016.2)

Pro. Li Wang (Visiting professor from Zhejiang Gongshang University. 2016.5-2016.10)

Dennis Curry (MSc candidate, hired through the University of Waterloo. 2014.9-2016.8)

Bruce MacDonald (Research Assistant. 2015.9-2016.8)

Kori Andrea (Summer student. 2016.5-2016.8)

Hope Scheller (Undergraduate researcher for her honors degree. 2014.10-2016.5)

## ***Academic Services***

Peer Reviewer for > 100 articles submitted to the relevant professional journals for publishing: Analytical Chemistry, RSC Advances, Journal of Chromatography A., Journal of Chromatography B., Chemosphere, Environmental Science & Technology, Applied Surface Chemistry, Analytical Chemistry Research, Analytical Methods, the Analyst.

## ***Publications***

**H index: 23**

**([http://scholar.google.ca/citations?hl=en&user=ViTzkAgAAAAJ&view\\_op=list\\_works](http://scholar.google.ca/citations?hl=en&user=ViTzkAgAAAAJ&view_op=list_works)),**

1361 citations since 2011.

### **Articles accepted or published in refereed journals:**

1. Lu, M.<sup>‡</sup>; Shan, Z.; Andrea, K.; MacDonald, B.; Beale, S.; Curry, D.; Wang, L.; Wang, S.; Oakes, K.; Bennett, C.; Wu, W.\*; **Zhang, X\*** (2016). Chemisorption Mechanism of DNA on Mg/Fe Layered Double Hydroxide Nanoparticles: Insights into Engineering Effective siRNA Delivery Systems. *Langmuir* (2015 Impact Factor: 4.46). Published online. DOI: 10.1021/acs.langmuir.5b04643 (\*Co-corresponding author; <sup>‡</sup>Visiting scholar)
2. Sun, J.<sup>‡</sup>; Curry, D.<sup>‡</sup>; Yuan, Q.; **Zhang, X.\***; Liang, H.\* (2016) Highly Hybridizable Spherical Nucleic Acids by Glutathione Treatment and Polythymine Spacing. *ACS Applied Materials & Interfaces* (2015 Impact Factor: 6.72). Accepted. (\*Co-corresponding authors; <sup>‡</sup>graduate students)
3. Kong, F.<sup>†</sup>; Zhang, H.<sup>†</sup>; **Zhang, X.<sup>†</sup>**; Qu, X.; Servos, M.; Mäkilä, E.; Salonen, J.; Santos, H.A.; Hai, M.\* (2015) Biocompatible Photothermal Responsive Porous Silicon Nanoparticles @ Double Emulsion Nano-in-Micro Platform for dsDNA and Therapeutics Co-Delivery and Combination Therapy. *Advanced Healthcare Materials* (2015 Impact Factor: 5.80). Accepted pending in revision. (†Equal contribution).
4. Shan, Z.<sup>‡</sup>; Lu, M.; Wang, L.; Mkandawire, M. **Zhang, X.\***; Oakes, K. (2015) Chloride Accelerated Fenton Chemistry for Ultrasensitive and Selective Colorimetric Detection of Copper. *Chemical Communications* (2015 Impact Factor: 6.83). DOI: 10.1039/C5CC07446K. Accepted manuscript published online. (\*Corresponding author; <sup>‡</sup>Postdoctoral researcher)
5. Curry, D.<sup>‡</sup>; Cameron, A.; MacDonald, B.; Nganou, C.; Sheller, H.; Marsh, J.; Beale, S.; Lu, M.; Shan, Z.; Kaliaperumal, R.; Xu, H.; Servos, M.; Bennett, C.; MacQuarrie, S.; Oakes, K.; Mkandawire, M.; **Zhang, X.\***. (2015) Adsorption of Doxorubicin on Citrate-Capped Gold Nanoparticles: Insights into Engineering Potent Chemotherapeutic Delivery Systems. *Nanoscale* (2015 Impact Factor: 7.39). 7, 19611 – 19619. DOI: 10.1039/C5NR05826K. (\*Corresponding author; <sup>‡</sup>graduate student).
6. Curry, D.<sup>‡</sup>; Sheller, H.; Lu, M.; Mkandawire, M.; Servos, M. R. Cui, S.; **Zhang, X.\***; Oakes, K. (2015) Prevention of doxorubicin sorptive losses in drug delivery studies using polyethylene glycol. *RSC*

- Advances* (2015 Impact Factor: 3.84), 5, 25693-25698. DOI: 10.1039/c5ra01799h. (\*Corresponding author; †graduate student)
7. Kong, F.<sup>†</sup>; **Zhang, X.**<sup>†</sup>; Zhang, H.<sup>†</sup>; Qu, X.; Chen, D.; Servos, M.; Mäkilä, E.; Salonen, J.; Santos, H.A.; Hai, M.\*; Weitz, David A.\* (2015) Inhibition of Multidrug Resistance of Cancer Cells by Co-Delivery of DNA Nanostructures and Drugs Using Porous Silicon Nanoparticles@Giant Liposomes, *Advanced Functional Materials* (2015 Impact Factor: 11.8). 25, 3330-3340. (†Equal contribution). <http://onlinelibrary.wiley.com/doi/10.1002/adfm.201500594/full>
  8. Xu, B.; Chen, M.; Hou, J.; Chen, X.; **Zhang, X.**; Cui, S. (2015) Calibration of pre-equilibrium HF-LPME and its application to the rapid determination of free analytes in biological fluids. *Journal of Chromatography B* (2015 Impact Factor: 2.74). 980, 28–33. DOI: 10.1016/j.jchromb.2014.12.022.
  9. Shan, Z.; Jiang, Y.; Guo, M.; Bennett, J.C.; Li, X.; Tian, H.; Oakes, K.; **Zhang, X.**; Zhou, Y.; Huang, Q.; Chen, H. (2015) Promoting DNA loading on magnetic nanoparticles using a DNA condensation strategy. *Colloids and Surfaces B: Biointerfaces* (2015 Impact Factor: 4.15). 125, 247–254. DOI: 10.1016/j.colsurfb.2014.10.036.
  10. **Zhang, X.**; Wang, F.; Liu, B.; Kelly, E.; Servos, M. R.; Liu, J. (2014) Adsorption of DNA Oligonucleotides by Titanium Dioxide Nanoparticles, *Langmuir* (2015 Impact Factor: 4.46), DOI: 10.1021/la404633p, 30, 839-845.
  11. Zhou, J.; Zhang, Y.; Xu, B.; **Zhang, X.**; Cui, S. (2014) Analysis of Local Anesthetics in Biological Samples via Kinetically Calibrated Liquid-Phase Solvent Bar Micro-Extraction Combined with HPLC. *Chromatographia* (2015 Impact Factor: 1.41). DOI: 10.1007/s10337-014-2713-x. 77, 1213-1221.
  12. Kong, F.<sup>†</sup>; **Zhang, X.**<sup>†</sup>; Hai, M. (2014) Microfluidics Fabrication of Monodisperse Biocompatible Phospholipid Vesicles for Encapsulation and Delivery of Hydrophilic Drug or Active Compound, *Langmuir* (2015 Impact Factor: 4.46), DOI: 10.1021/la404201m. 30, 3905-3912. (†Equal contribution)
  13. Liu, B.; Huang, P. J.; **Zhang, X.**; Wang, W.; Pautler, R.; Ip, A. Liu, J. (2013) Parts-per-Million of Polyethylene Glycol as a Non-Interfering Blocking Agent for Homogeneous Biosensor Development, *Analytical Chemistry* (2015 Impact Factor: 5.65), DOI: 10.1021/ac4024654. 85, 10045-10050.
  14. Liu, B.; Sun, Z.; **Zhang, X.**; Liu, J. (2013) Mechanisms of DNA Sensing on Graphene Oxide, *Analytical Chemistry* (2015 Impact Factor: 5.65), DOI: 10.1021/ac401845p. 85, 7987-7993.
  15. **Zhang, X.**; Gouriye, T.; Goeken, K.; Servos, M. R.; Gill, R.; Liu, J. (2013) Towards Fast and Quantitative Modification of Large Gold Nanoparticles by Thiolated DNA: Scaling of Nanoscale Forces, Kinetics and the Need for Thiol Reduction, *Journal of Physical Chemistry C* (2015 Impact Factor: 4.77), DOI: 10.1021/jp403946x. 117, 15677-15684.
  16. **Zhang, X.**; Liu, B., Servos, M. R. Liu, J. (2013) Polarity Control for Non-thiolated DNA Adsorption onto Gold Nanoparticles, *Langmuir* (2015 Impact Factor: 4.46), DOI: la-2013-00617u.R2. 29, 6091-6098.
  17. Lang, N.; Liu, B.; **Zhang X.**; Liu, J. (2013) Dissecting Colloidal Stabilization Factors in Crowded

- Polymer Solutions by Forming Self-Assembled Monolayers on Gold Nanoparticles, *Langmuir*, 29, 6018-6024.
18. Hu, A., Liang, R., **Zhang, X.**, Kurdi, S., Luong, D., Huang, H., Peng, P., Marzbanrad, E., Oakes, D. K., Zhou, Y., Servos, M. R. (2013) Enhanced photocatalytic degradation of dyes by TiO<sub>2</sub> nanobelts with hierarchical Structure. *Journal of Photochemistry and Photobiology A: Chemistry* (2015 Impact Factor: 2.50) 256, 7-15.
  19. **Zhang, X.** Dave, N., Servos, M. R. Liu, J. (2012) Instantaneous Attachment of an Ultrahigh Density of Non-thiolated DNA to Gold Nanoparticles and Its Applications, *Langmuir*(2015 Impact Factor: 4.46), **DOI:** 10.1021/la3035424. 28, 17053-17060.
  20. Shin, J., **Zhang, X.**, Liu, J. (2012) DNA-Functionalized Gold Nanoparticles in Macromolecularly Crowded Polymer Solutions", *Journal of Physical Chemistry B* (2015 Impact Factor: 3.30), 116, 13396-13402.
  21. Cui, S., Ouyang, G., Duan, G., Hou, J., Luan, T., **Zhang, X.** (2012) The mass transfer dynamics of hollow fiber liquid-phase microextraction and its application for rapid analysis of biological samples. *Journal of Chromatography A* (2015 Impact Factor: 4.17). **DOI:** 10.1016/j.chroma.2012.10.024. 1266, 10-16.
  22. **Zhang, X.**, Huang, P. J., Servos, M. R. Liu, J. (2012) Effects of Polyethylene Glycol on DNA Adsorption and Hybridization on Gold Nanoparticles and Graphene Oxide, *Langmuir*, **DOI:** 10.1021/la302799s. 28, 14330-14337.
  23. **Zhang, X.**, Servos, M. R., Liu, J. (2012) Fast pH-assisted functionalization of silver nanoparticles with monothiolated DNA, *Chemical Communications* (2015 Impact Factor: 6.8), 48, 10114-10116.
  24. Hu, A., **Zhang, X.**, Luong, D., Oakes, D. K., Servos, M. R., Liang, R., Kurdi, S., Peng, P., Zhou, Y. (2012) Adsorption and photocatalytic degradation kinetics of pharmaceuticals by TiO<sub>2</sub> nanowires during water treatment. *Waste Biomass Valorization* (2015 Impact Factor: 1.05), **DOI** 10.1007/s12649-012-9142-6. 3, 443-449.
  25. **Zhang, X.**, Oakes, K., Hoque, M., Luong, D., Metcalfe, C. D., Servos, M. R. (2012) Depth-Profiling of Environment Pharmaceuticals in Biological Tissue by Solid-Phase Microextraction. *Analytical Chemistry* (2015 Impact Factor: 5.65), **DOI:** 10.1021/ac3004659. 84, 6956-6962.
  26. **Zhang, X.**, Servos, M. R. Liu, J. (2012) Ultrahigh Nanoparticle Stability against Salt, pH and Solvent with Retained Surface Accessibility via Depletion Stabilization, *Journal of the American Chemical Society* (2015 Impact Factor: 12.11), **DOI:** 10.1021/ja303787e. 134, 9910-9913.
  27. **Zhang, X.**, Servos, M. R. Liu, J. (2012) Instantaneous and Quantitative Functionalization of Gold Nanoparticles with Thiolated DNA Using a pH-Assisted and Surfactant-Free Route, *Journal of the American Chemical Society* (2015 Impact Factor: 12.11), **DOI:** 10.1021/ja3014055. 134, 7266-7269.
  28. **Zhang, X.**, Servos, M. R. Liu, J. (2012) The Surface Science of DNA Adsorption onto Citrate-Capped

- Gold Nanoparticles", *Langmuir* (2015 Impact Factor: 4.46), DOI: 10.1021/la205036p. 28, 3896–3902.
29. **Zhang, X.**, Oakes, K., Wang, S.; Metcalfe, C. D., Pawliszyn, J., Servos, M. R. (2012) In Vivo Sampling of Environmental Organic Contaminants in Fish by Solid-Phase Microextraction. *Trends in Analytical Chemistry* (2015 Impact Factor: 6.47). 32, 31-39.
  30. **Zhang, X.**, Oakes, K., Hoque, M., Luong, D., Metcalfe, C. D., Servos, M. R. (2011) Solid-Phase Microextraction Coupled to LC-ESI-MS/MS: Evaluation and Correction for Matrix Effects for Pharmaceutical Analysis in Biological and Environmental Samples. *Analytical Chemistry* (2015 IF: 5.65). 83, 6532–6538.
  31. **Zhang, X.**, Oakes, K., Hoque, M., Luong, D., Metcalfe, C. D., Pawliszyn, J., Servos, M. R. (2011) Pre-equilibrium Solid-Phase Microextraction of Free Analyte in Complex Samples: Correction for Mass Transfer Variation from Protein Binding and Matrix Tortuosity. *Analytical Chemistry* (2015 IF: 5.65). 83, 3365-3370.
  32. **Zhang, X.**, Oakes, K., Luong, D., Metcalfe, C. D., Pawliszyn, J., Servos, M. R. (2011) Kinetically-Calibrated Solid-Phase Microextraction using Label-Free Standards and its Application for Pharmaceutical Analysis. *Analytical Chemistry* (2015 IF: 5.65). 83, 2371–2377.
  33. Hu, A., **Zhang, X.**, Oakes, K., Peng, P., Zhou, Y. N., Servos, M. R. (2011) Hydrothermal growth of TiO<sub>2</sub> nanowire membranes for ultrafiltration and photocatalytic degradation of pharmaceuticals, *Journal of Hazardous Materials* (2015 IF: 4.53). 189, 278-285.
  34. Lord, H., **Zhang, X.**, Musteata, F., Vuckovic, D., Pawliszyn, J. (2011) *In vivo* solid-phase microextraction for monitoring intravenous concentrations of drugs and metabolites. *Nature Protocol* (2015 IF: 9.67). 6, 896–924.
  35. Shan, Z., Li, C., **Zhang, X.**, Oakes, K.; Servos, M. R., Wu, Q., Chen, H., Wang X., Huang, Q., Zhou, Y., Yang, W. (2011) Temperature-dependent Selective Purification of Plasmid DNA Using Magnetic Nanoparticles in an RNase-free Process. *Analytical Biochemistry* (2015 IF: 2.22). 412, 117-119.
  36. **Zhang, X.**, Oakes, K., Luong, D., Wen, J. Z., Metcalfe, C. D., Pawliszyn, J., Servos, M. R. (2010) Temporal Resolution of Solid-Phase Microextraction: Measurement of Real-Time Concentrations within a Dynamic System. *Analytical Chemistry* (2015 IF: 5.65). 82, 9492–9499.
  37. **Zhang, X.**, Oakes, K., Cui, S., Bragg, L., Servos, M., Pawliszyn, J. (2010) Tissue-specific *In Vivo* Bioaccumulation of Pharmaceuticals in Rainbow Trout (*Oncorhynchus mykiss*) using Space-resolved Solid-Phase Microextraction. *Environmental Science & Technology* (2015 IF: 5.33). 44, 3417-3422.
  38. Shan, Z., Wu, Q., Wang X., Zhou, Z., **Zhang, X.**, Yang, W. (2010) Bacteria Capture, Lysate Clearance and Plasmid DNA Extraction Based on pH Sensitive Multifunctional Magnetic Nanoparticles, *Analytical Biochemistry* (2015 IF: 2.22). 398, 120-122.
  39. Vuckovic, D., **Zhang, X.**, Cudjoe, E, Pawliszyn, J. (2010) Solid-Phase Microextraction in Bioanalysis: New devices and directions. *Journal of Chromatography A* (2015 IF: 4.15). 1217, 4041-4060.

40. **Zhang, X.**, Cai, J., Oakes, K., Breton, F., Servos, M., Pawliszyn, J. (2009) Development of the Space-Resolved Solid-Phase Microextraction (SR-SPME) Technique and its Application to Biological Matrices. *Analytical Chemistry* (2015 IF: 5.65) *81*, 7349-7356.
41. **Zhang, X.**, Cudjoe, E., Vuckovic, D., Pawliszyn, J. (2009) Direct monitoring of ochratoxin A in cheese with solid-phase microextraction coupled to liquid chromatography-tandem mass spectrometry. *Journal of Chromatography A* (2015 IF: 4.15). *1216*, 7505-7509.
42. **Zhang, X.**, Eshaghi, Al., Cai, J., Pawliszyn, J. (2009) Simplified Kinetic Calibration of Solid-Phase Microextraction for *in vivo* Pharmacokinetics. *Journal of Chromatography A* (2015 IF: 4.15). *1216*, 7664-7669.
43. Ouyang, G., Cai, J.; **Zhang, X.**; Li, H.; Pawliszyn, J. (2008) Standard-free kinetic calibration for rapid on-site analysis by solid-phase microextraction. *Journal of Separation Science* (2015 IF: 2.74). *31*, 1167-72.
44. **Zhang, X.**, Eshaghi, A., Musteata, F. Ouyang, G., Pawliszyn, J. (2007) Quantitative *in vivo* Microsampling for Pharmacokinetic Studies Based on an Integrated Solid-Phase Microextraction System. *Analytical Chemistry* (2015 IF: 5.65). *79*: 4507-4513.
45. Zhou, S.<sup>†</sup>, **Zhang, X.**<sup>†</sup>, Ouyang, G., Eshaghi, A., Pawliszyn, J. (2007) On-Fiber Standardization Technique for Solid-Coated Solid-Phase Microextraction. *Analytical Chemistry* (2015 IF: 5.65). *79*: 1221-1230. (†Equal contribution)
46. Eshaghi, A., **Zhang, X.**, Musteata, F., Ouyang, G., Pawliszyn, J. (2007) Evaluation of bio-compatible poly(ethylene glycol)-based solid-phase microextraction fiber for *in vivo* pharmacokinetic studies of diazepam in dogs. *The Analyst* (2015 IF: 4.11). *132*: 672-678.
47. Shan, Z., Yang, W., **Zhang, X.**, Huang, Q., Ye, H. (2007) Preparation and Characterization of Carboxyl-Group Functionalized Superparamagnetic Nanoparticles and the Potential for Bio-Applications. *Journal of the Brazilian Chemical Society*.*18*: 1329-1335.
48. Xie, X., Nie, X., Yu, B., **Zhang, X.**\* (2007) Rapid enrichment of leucocytes and genomic DNA from blood based on bifunctional core-shell magnetic nanoparticles. *Journal of Magnetism and Magnetic Materials*. *311*: 416-420. (\*Corresponding author)
49. Xie, X.<sup>†</sup>, **Zhang, X.**<sup>†</sup>, Gao, H., Zhang, H., Chen, D., Cheng, J., Fei, W. (2004) DNA purification and gene typing: based on multifunctional nanobeads. *Chinese Science Bulletin*. *49*: 886-889. (†Equal contribution)
50. Xie, X.<sup>†</sup>, **Zhang, X.**<sup>†</sup>, Yu, B., Gao, H., Zhang, H., Fei, W. (2004) Rapid extraction of genomic DNA from saliva for HLA typing on microarray based on magnetic nanobeads. *Journal of Magnetism and Magnetic Materials*. *280*: 164-168. (†Equal contribution)
51. Xie, X.<sup>†</sup>, **Zhang, X.**<sup>†</sup>, Zhang, H., Chen, D., Fei, W. (2004) Preparation and application of surface-coated superparamagnetic nanobeads in the isolation of genomic DNA. *Journal of Magnetism and Magnetic Materials*. *277*: 16-23. (†Equal contribution)



**Peer-reviewed Book Chapter:**

52. Oakes, K.; Shan, Z.; Kaliaperumal, R.; **Zhang, X.**; Mkandawire, M. (2014) Nanotechnology in Contemporary Mine Water Issues. In "Nanotechnology for Water Treatment and Purification" Edited by Hu, A. & Aplett, A. Springer International Publishing Switzerland.

**Patents and Intellectual Property Rights**

1. Copper based Immunoassays. *PCT*, Date of Patent filed: Sep. 8, 2015. Inventors: **Xu Zhang**, Mingsheng Lu, Zhi Shan.
2. Method and composition for detecting copper. *PCT*, Date of Patent filed: Jul. 28, 2015. Inventors: **Xu Zhang**, Zhi Shan.
3. Non-thiolated DNA functionalized gold nanoparticles. *PCT*, Date of Patent filed: Jul. 23, 2012. Inventors: Juewen Liu, **Xu Zhang**.
4. Processes for producing coated magnetic microparticles and uses thereof, *PCT*, WO02/075309, European Patent Application EP1381861, and Chinese patent No.: ZL 01109870.8. Date of Patent: June. 02, 2004. (Two patents for the same item: a Chinese patent and an international patent. Inventors: Depu Chen, Xin Xie, **Xu Zhang**, Baoquan Sun, Prof. Weiyang Fei, Prof. Yuxiang Zhou, Prof. Jing Cheng.
5. Method of Nucleic Acid Separation from Biological Particles Using Solid Substrates. Chinese patent NO.: ZL01140445.0. Date of Patent: March 14, 2007. Inventors: **Xu Zhang**, Xin Xie, Jiming Chen, Prof. Depu Chen, Prof. Weiyang Fei, Prof. Jing Cheng.
6. The method and kit for cell separation. Chinese patent No.: ZL 02153992.8. Date of Patent: December. 7, 2005. Inventors: **Xu Zhang**, Xin Xie, Prof. Depu Chen, Prof. Weiyang Fei, Prof. Jing Cheng.
7. The method and kit for amplification of gene from virus and target cells, Chinese Patent No.: ZL 02155237.1. Date of Patent: October. 19, 2005. Inventors: Xin Xie, **Xu Zhang**, Prof. Depu Chen, Prof. Weiyang Fei, Prof. Jing Cheng.
8. Magnetism based nucleic acid amplification, PCT/CN02/00940.: PCT patents. Inventors: **Xu Zhang**, Xin Xie, Prof. Depu Chen, Prof. Weiyang Fei, Prof. Jing Cheng.
9. Magnetism based rapid cell separation, PCT/CN02/00942. PCT patents. Inventors: Xin Xie, **Xu Zhang**, Prof. Depu Chen, Prof. Weiyang Fei, Prof. Jing Cheng.

**Recent Invited Talk, Conference Presentations or Published in Proceedings:**

1. **Xu Zhang**, Multifunctional Nano-Theranostic Platforms for Enhanced Cancer Treatment. 2015 Canadian Cancer Research Conference. Montreal, Canada. Nov 7-11, 2015. Poster. New PI Awardee Poster.
2. Dennis Curry, Hope Scheller, Mark Servos, Ken Oakes and **Xu Zhang**. DNA-Targeted Hollow Gold Nanoparticles for Radiation and Photothermal Treatment of Triple-Negative Breast Cancer. 2015 Canadian Cancer Research Conference. Montreal, Canada. Nov 7-11, 2015. Poster.

3. **Xu Zhang**, PEG--- a versatile material in bio-nanotechnology. Beijing University of Chemical Technology. Beijing, China. Oct. 26, 2014. **Invited Talk.**
4. **Xu Zhang**, DNA nanotechnology and Drug Targeted Delivery. Hosted by the Huaihai Institute of Technology. Lianyungang, China. Oct. 8, 2014. **Invited Talk.**
5. **Xu Zhang**, DNA-Gold nano-conjugate and its applications in environmental and medicine. Beijing University of Chemical Technology. Beijing, China. Nov. 11, 2013. **Invited Talk.**
6. **Xu Zhang**, Drug delivery based on DNA nanotechnology. Hosted by the Department of Biological Applied Engineering and Shenzhen Key Laboratory of Fermentation, Purification and Analysis in Shenzhen Polytechnic, Shenzhen. Nov. 21, 2013. **Invited Talk.**
7. Servos, M. and **X. Zhang**. Development of "in vivo" solid phase micro-extraction (SPME) for bioaccumulation in fish. Workshop ILSI-In-vivo bioaccumulation experts workshop. ILSI Health and Environmental Sciences Institute (HESI). Berlin, Germany, May 17-18, 2012. **Invited Talk.**
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