

Xue QIU-Curriculum Vitae

Prof. Dr. Xue QIU

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Education History

09.2012-06.2016 Institut d'Electronique Fondamentale, **Université Paris-Sud, France**

Doctor degree in electronique and optoelectronique, nano- and microtechnologies.

PhD thesis: Time-Gated Förster Resonance Energy Transfer Biosensors for Multiplexed Diagnostics of Epidermal Growth Factor Receptors and MicroRNAs, under the supervision of Prof. Niko Hildebrandt

09.2009-06.2012 School of Pharmacy, **Fudan University, China**

Master degree in Pharmaceutical Analysis.

Master thesis: Coupling Fluorescent Silver Nanoclusters and DNA Amplification Platforms for the Detection of Biomolecules, under the supervision of Prof. Jianzhong Lu

09.2005-06.2009 School of Pharmacy, **Shandong University, China**

Bachelor degree in Pharmacy.

Employment History

04.2020-present: **Full Professor/Principle Investigator/PhD supervisor**, Team Leader of “FRETmedicine” Group, School of Medicine and Pharmacy, Ocean University of China

01.2018-07.2019: **Senior Researcher**, NanoBioPhotonics, Institute for Integrative Biology of the Cell, Université Paris-Sud/CNRS/CEA

07.2016-12.2017: **Post-doc Researcher**, NanoBioPhotonics, Institute for Integrative Biology of the Cell, Université Paris-Sud/CNRS/CEA

Research Interests

Förster Resonance Energy Transfer (FRET) based:

1. *In vitro* Molecular Diagnostics
2. High-Throughput Screening
3. Nanobiophotonics
4. Conformational Change and Molecular Interactions

Skills and Techniques

Spectroscopy: UV-Vis-NIR Absorption, UV-Vis-NIR Luminescence (steady-state and time-resolved).

Fluorescence microscopy: steady-state and time-resolved cell imaging, protein-protein interaction.

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Molecular biotechnology: Fragmentation of antibodies, electrophoresis, PCR, rolling circle amplification (RCA), cell culture, ensemble FRET measurement for DNA conformation change study.

Bioconjugation: Functionalization of biomolecules (antibodies, DNAs) with luminescent reporters (terbium complex, quantum dots, metal nanoparticles, polystyrene beads and magnetic beads).

Analytical technology: Förster resonance energy transfer (terbium complex to quantum dots) based proteins or DNA/RNA biomarkers homogenous assays, fluorescence (dyes, polymers, nanoparticles) or chemiluminescence (HRP / luminal / H₂O₂ or Au NPs / luminal / AgNO₃ systems) based heterogenous assays.

Teaching Experiences

2021-present: Instructor of *Pharmaceutical Analysis* (practical course) dedicated to undergraduate students in School of Medicine and Pharmacy, Ocean University of China

2020-present: Instructor of *Scientific Seminars* dedicated to fresh undergraduate students in School of Medicine and Pharmacy, Ocean University of China

2020-present: Instructor of *Scientific Writing* dedicated to MS/Ph.D students in School of Medicine and Pharmacy, Ocean University of China

2014-2018: Mentor of three PhD and one master candidates in NanoBioPhotonics group, Université Paris-Sud

2012-2018: Instructor of *Biophysics* (practical course) dedicated to master students in SERP CHEM international program, Université Paris-Sud

2010-2011: Teaching Assistant of *Instrumental analysis* (practical course) dedicated to bachelor students in School of Pharmacy, Fudan University

2010-2011: Instructor of *Pharmaceutical Analysis* dedicated to bachelor students in School of Continuing Education, Fudan University

Talks in International Conferences

1. **X. Qiu**, Yu-Tang Wu, K. David Wegner, Sarah Lindbo, Kimihiro Susumu, Travis L. Jennings, Igor L. Medintz, Sophia Hober, Paul M. P. van Bergen en Henegouwen, Niko Hildebrandt. Ultrasmall affinity proteins, nanobodies and antibodies for EGFR/HER2 immunoassays using terbium-to-quantum dot FRET. The 2nd International Conference on Nanobody for Immunological Analysis and Application, Guangzhou, China, **2019**. Invited talk
2. **X. Qiu**, J. Guo, Z. Jin, I. L. Medintz, N. Hildebrandt. A Single Tb-to-Quantum Dot FRET Pair for Temporally Multiplexed Detection of Nucleic Acids. SciX 2017. Reno, Nevada, USA, **2017**. Invited talk
3. X. Qiu, Jiajia Guo, Zongwen Jin, Igor L. Medintz, Niko Hildebrandt. Multiplexed Nucleic Acid Hybridization Assays Using Single Tb-to-Quantum Dot Pair Distance-Tuning. NaNaX8, Braga, Portugal, **2017**. Contributed talk
4. **X. Qiu**, Z. Jin, A. Yahia-Ammar, N. Hildebrandt. Rapid, Amplification-Free, and Sensitive Diagnostic Assays for Single-Step Multiplexed Fluorescence Detection of

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- MiRNA. Fourth international Molecular Diagnostics Europe. Lisbon, Portugal, **2016**.
Invited talk
5. **X. Qiu**, J. Guo, Z. Jin, I. L. Medintz, N. Hildebrandt. Terbium Complex to Quantum Dot Förster Resonance Energy Transfer for Homogeneous and Multiplexed MiRNA Assay. Photonics West. San Francisco, USA, **2016**. Invited talk
 6. **X. Qiu** and N. Hildebrandt. Rapid and Multiplexed MiRNA Diagnostic Assay Using Quantum Dot-Based Förster Resonance Energy Transfer. MAF14, Würzburg, Germany, **2015**. Contributed talk

Publications

(2 *ACS Nano*, 1 *Anal. Chem.*, 2 *ACS Sensors*, 1 *Small*, 1 *J. Phys. Chem. Lett.*, 1 *Chem. Sci.*, 1 *Chem. Mater.*, 1 *Biosens. Bioelectron.*, 1 *Analytica Chimica Acta* as first (co-first) or co-corresponding author with an averaged impact factor of 9.5, and 13 co-author papers published e.g., in *Angew. Chem. Int. Ed.*, *Sci. Adv.*, *Small*, and *J. Phys. Chem. Lett.*. 3 journal covers, 800+ citations and H-index of 15 from Google scholar <https://scholar.google.com/citations?user=1rL1q7kAAAAJ&hl=en>)

Research Papers

1. J. Xu, J. Guo, N. Golob-Schwarzl, J. Haybaeck, **X. Qiu*** and N. Hildebrandt*. Single-Measurement Multiplexed Quantification of MicroRNAs from Human Tissue Using Catalytic Hairpin Assembly and Förster Resonance Energy Transfer. *ACS Sensors*, **2020**, 5, 1768–1776. (IF=7.33)
2. **X. Qiu***, Olivier Guittet, Carlos Mingoos, Nadine El Banna, Meng-Er Huang, Michel Lepoivre*, and Niko Hildebrandt*. Quantification of Cellular Deoxyribonucleoside Triphosphates by Rolling Circle Amplification and Förster Resonance Energy Transfer. *Analytical Chemistry*, **2019**, 91, 14561–14568. (IF=6.78)
3. M. Dekaliuk, **X. Qiu***, F. Troalen, P. Busson, and N. Hildebrandt*. Discrimination of the V600E Mutation in BRAF by Rolling Circle Amplification and Förster Resonance Energy Transfer. *ACS Sensors*, **2019**, 4, 10, 2786-2793. (IF=7.33)
4. J. Guo[#], **X. Qiu[#]**, C. Mingoos, J.R. Deschamps, K. Susumu, I.L. Medintz, and N. Hildebrandt*. Conformational Details of Quantum Dot-DNA Resolved by Förster Resonance Energy Transfer Lifetime Nanoruler. *ACS Nano*, **2019**, 13, 505-514. (IF=14.6)
5. **X. Qiu**, J. Xu, J. Guo, A. Yahia-Ammar, N.-I. Kapetanakis, I. Duroux-Richard, J.J. Unterluggauer, N. Golob-Schwarzl, C. Regeard, C. Uzan, S. Gouy, M. DuBow, J. Haybaeck, F. Apparailly, P. Busson, and N. Hildebrandt*. Advanced microRNA-based cancer diagnostics using amplified time-gated FRET. *Chemical Science*, **2018**, 9, 8046-8055. (IF=9.35) **Cover and 2018 Chemical Science HOT paper**
6. **X. Qiu[#]**, J. Guo[#], J. Xu, and N. Hildebrandt*. Three-Dimensional FRET Multiplexing for DNA Quantification with Attomolar Detection Limits. *Journal of Physical*

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Chemistry Letters, **2018**, 9, 4379–4384. (IF=6.71)

7. **X. Qiu**, J. Guo, Z. Jin, I. L. Medintz, N. Hildebrandt*. Multiplexed Nucleic Acid Hybridization Assays Using Single-FRET-Pair Distance-Tuning. *Small*, **2017**, 13, 1700332. (IF=11.5)
8. **X. Qiu**, K. D. Wegner, Y.T. Wu, P. M.P. van Bergen en Henegouwen, T. L. Jennings, and N. Hildebrandt*. Nanobodies and Antibodies for Duplexed EGFR/HER2 Immunoassays Using Terbium-to-Quantum Dot FRET. *Chemistry of Materials*, **2016**, 28, 8256-8267. (IF=9.57) Cover
9. **X. Qiu** and N. Hildebrandt*. Rapid and Multiplexed MicroRNA Diagnostic Assay Using Quantum Dot-Based Förster Resonance Energy Transfer. *ACS Nano*, **2015**, 9(8), 8449-8457. (IF=14.6)
10. **X. Qiu**, P. Wang, Z. Cao*. Hybridization chain reaction modulated DNA-hosted silver nanoclusters for fluorescent identification of single nucleotide polymorphisms in the let-7 miRNA family. *Biosensors and Bioelectronics*, **2014**, 60, 351–357. (IF=10.3)
11. W. Song[#], **X. Qiu**[#], C. Lau, J. Lu*. Quantum Dot-enhanced Detection of Dual Short RNA Sequences via One-step Template-Dependent Surface Hybridization. *Analytica Chimica Acta*, **2012**, 735, 114-120. (IF=5.98)
12. S. Bhuckory, K. D. Wegner, **X. Qiu**, Y.-T. Wu, T. L. Jennings, A. Incamps, and N. Hildebrandt. Triplexed CEA-NSE-PSA Immunoassay Using Time-Gated Terbium-to-Quantum Dot FRET. *Molecules* **2020**, 25, 3679. (IF=3.3)
13. T. Hallaj, M. Amjadi, **X. Qiu**, K. Susumu, I.L. Medintz, and N. Hildebrandt. Terbium–To–Quantum Dot Förster Resonance Energy Transfer for Homogeneous and Sensitive Detection of Histone Methyltransferase Activity. *Nanoscale* **2020**, 12, 13719-13730.
14. E. Porret, M. Jourdan, B. Gennaro, C. Comby-Zerbino, F. Bertorelle, V. Trouillet, **X. Qiu**, C. Zoukimian, D. Boturnyn, N. Hildebrandt, R. Antoine, J.-L. Coll*, X. Le Guével*. Influence of the Spatial Conformation of Charged Ligands on the Optical Properties of Gold Nanoclusters. *Journal of Physical Chemistry C*, **2019**, 123, 43, 26705-26717. (IF=4.2)
15. J. Guo, C. Mingoies, **X. Qiu**, and N. Hildebrandt*. Simple, Amplified, and Multiplexed Detection of MicroRNAs Using Time-Gated FRET and Hybridization Chain Reaction. *Analytical Chemistry*, **2019**, 91, 3101–3109. (IF=6.78)
16. Y.-T. Wu, **X. Qiu**, S. Lindbo, K. Susumu, I.L. Medintz, S. Hober, and Niko Hildebrandt*. Quantum Dot Based FRET Immunoassay for HER2 Using Ultrasmall Affinity Proteins. *Small*, **2018**, 14, 1802266. (IF=11.5)
17. S. Díaz, G. Lasarte Aragonés, S. Buckhout-White, **X. Qiu**, E. Oh, K. Susumu, J. Melinger, A. Huston, N. Hildebrandt, and I.L. Medintz*. Bridging Lanthanide to

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- Quantum Dot Energy Transfer with a Short Lifetime Organic Dye. *The Journal of Physical Chemistry Letters*, **2017**, 8 (10), 2182-2188. (IF=6.7)
18. S. Bhuckory, L. Mattera, K. D. Wegner, X. Qiu, Y-T. Wu, L. J. Charbonnière, P. Reiss*, and N. Hildebrandt*. Direct conjugation of antibodies to the ZnS shell of quantum dots for FRET immunoassays with low picomolar detection limits. *Chemical Communications*, **2016**, 52, 14423-14425. (IF=6.0)
 19. L. Mattera, S. Bhuckory, K. D. Wegner, X. Qiu, F. Agnese, C. Lincheneau, T. Senden, D. Djurado, L. J. Charbonnière, N. Hildebrandt*, P. Reiss*. Compact quantum dot-antibody conjugates for FRET immunoassays with subnanomolar detection limits. *Nanoscale*, **2016**, 8(21), 11275-83. (IF=6.9)
 20. H. Samareh Afsari, M. Cardoso Dos Santos, S. Lindén, T. Chen, X. Qiu, P. M. P. van Bergen en Henegouwen, T. L. Jennings, K. Susumu, I. L. Medintz, N. Hildebrandt*, and L. W. Miller*. Time-gated FRET nanoassemblies for rapid and sensitive intra and extracellular fluorescence imaging. *Science Advances*, **2016**, 2(6), e1600265. (IF=13.1)
 21. S. Bhuckory, O. Lefebvre, X. Qiu, K. D. Wegner, and N. Hildebrandt*. Evaluating quantum dot performance in homogeneous FRET immunoassays for prostate specific antigen. *Sensors*, **2016**, 16(2), 197 (11 pages). (IF=3.3)
 22. Z. Jin, D. Geißler, X. Qiu, K. D. Wegner, and N. Hildebrandt*. Rapid, Amplification-Free, and Sensitive Diagnostic Assay for Single-Step Multiplexed Fluorescence Detection of MicroRNA. *Angewandte Chemie International Edition*, **2015**, 54, 10024-10029. (IF=13.0) Cover
 23. Z. Cao, P. Wang, X. Qiu, C. Lau, J. Lu*. Ligation-triggered fluorescent silver nanoclusters system for the detection of nicotinamide adenine dinucleotide. *Analytical and Bioanalytical Chemistry*, **2014**, 406, 1895–1902. (IF=3.6)
 24. Z. Cao, Q. Peng, X. Qiu, C. Liu, J. Lu*. Highly sensitive chemiluminescence technology for protein detection using aptamer-based rolling circle amplification platform. *Journal of Pharmaceutical Analysis*, **2011**, 1(3), 159–165. (IF=2.7)

Reviews and Perspectives

1. X. Qiu* and N. Hildebrandt*. A clinical role for Förster resonance energy transfer in molecular diagnostics of disease. *Expert Review of Molecular Diagnostics*, **2019**, 19(9),767-771. (IF=4.10)

Book Chapters

1. J. Xu, L. Francés-Soriano, J. Guo, T. Hallaj, X. Qiu*, and N. Hildebrandt*. Energy transfer with nanoparticles for in vitro diagnostics. In: W. Parak and N. Feliu, Editors: *Frontiers of Nanoscience, Volume 16, Colloids for Nanobiotechnology*. Elsevier 2020, ISBN 9780081028285.

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Patent

1. X. Qiu, N. Hildebrandt. Kit and method for detecting or quantifying one or multiple nucleic acid targets. EP16305582. 05/2016.