

Megan Yi-Ping Ho

Assistant Professor
Interdisciplinary Nanoscience Center (iNANO)
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Education

Ph.D. Mechanical Engineering, The Johns Hopkins University, Baltimore, MD, 2003–2008
Thesis: Single Molecule Biosensing with Quantum Dots for Nanomedicine in Diagnostics and Therapeutics
Advisor: Prof. Jeff Tza-Huei Wang

M.S. Power Mechanical Engineering, National Tsing-Hua University, Taiwan, 2000–2002
Thesis: The Study of MEMS Self-Assembly Technology
Advisor: Prof. Weileun Fang

B.S. Power Mechanical Engineering, National Tsing-Hua University, Taiwan, 1996–2000

Professional Experience

Assistant Professor, Aarhus University, Interdisciplinary Nanoscience Center (iNANO), 2012–Present

Co-Founder/Scientific Consultant, Zymonostics, Denmark, 2013–Present

Postdoctoral Research Associate, Duke University, Biomedical Engineering, 2008–2012
Advisor: Prof. Kam W. Leong

Research Assistant, The Johns Hopkins University, Mechanical Engineering, 2003–2008

Teaching Assistant, BioMEMS and Biosensing, The Johns Hopkins University, 2006

Teaching Assistant, Microfabrication Lab, The Johns Hopkins University, 2005

Teaching Assistant, Cell and Tissue Engineering Lab, The Johns Hopkins University, 2004–2006

R&D Engineer, Technology Development, Walsin-Lihwa MEMS Business Unit, Taiwan, 2002–2003

Research Assistant, National Tsing-Hua University, Power Mechanical Engineering, Taiwan, 2000–2002

Research Assistant, Industrial Technology Research Institution, Taiwan, 2001–2002 and 1998–1999

Selected Honors and Awards

Sapere Aude DFF-Ung Eliteforsker Award, Danish Council for Independent Research, 2012

Nominated for Outstanding Postdoc Award, Duke University, USA, 2011

Kewaunee Best Poster Award, Duke University, USA, 2009

Jorge Heller Outstanding Paper Award, Journal of Controlled Release, Elsevier, USA, 2007

MicroTAS Student Travel Award, DARPA, USA, 2005

Thesis Competition Award, School of Engineering, National Tsing-Hua University, Taiwan, 2002

Wu-Sheng Temple Graduate Student Scholarship, National Tsing-Hua University, Taiwan, 2000–2002

Mr. Chien Sheng Memorial Scholarship, National Tsing-Hua University, Taiwan, 2001

Outstanding Paper Award, TECO Technology Foundation, Taiwan, 2000

Thesis Competition Award, The Chinese Institute of Engineers, Taiwan, 2000

Class 1944 Alumni Scholarship, National Tsing-Hua University, Taiwan, 1999

Research Creativity Award, National Science Council, Taiwan, 1999

Mr. Shih-Chiang Wang's Memorial Scholarship, National Tsing-Hua University, Taiwan, 1998

Honorary Societies and Professional Memberships

Sigma Xi, The Scientific Research Society, 2009–present

Phi Tau Phi Scholastic Honor Society, Taiwan, 2002–present

Professional Membership: The Institute of Electrical and Electronics Engineers (IEEE), Controlled Release Society (CRS), Biomedical Engineering Society (BMES), Biophysical Society, The American Association for the Advancement of Science (AAAS)

Academic Service

Panelist, NSF Graduate Research Fellowship Program, 2013

Committee member, Professional Opportunities for Women (CPOW), Biophysical Society, 2010–2013

Poster Judge, Annual Sigma Xi Student Research Conference, 2010

Scientific Reviewer, Nanoscale, Journal of the Association for Laboratory Automation, Nanotechnology

Reviewer, Science Books & Films, American Association for the Advancement of Science, 2008–present

Mentoring Experience

Supervisor, Aarhus University, 2012–

PhD Students: Emil L. Kristoffersen and Charlotte Harmsen (Molecular Biology and iNANO), Noemi Gaglianone (Visiting Student from University of Rome); Master Student: Alessio Ottaviani (Visiting Student from University of Rome); Undergraduate: Morten L. Jepsen (Molecular Medicine)

Postdoc, Graduate and Undergraduate Students, Duke University, 2008–2012

Dr. Y. L. Chiu (Postdoc), C. L. Grigsby, Y. Zhang & H. F. Chan (PhD Students), S. Juul (Visiting Student, Aarhus University, Denmark), X. Pan (Visiting Student, Xi'an Jiaotong University, China), T. Schuhmann (Undergrad)

Graduate and Undergraduate Students, Johns Hopkins University, 2003–2008

Dr. V. Bailey (now Associate at McKinsey & Company), Y. Zhang (PhD Student), T. C. Lim (Undergrad, now PhD student at MIT), M. C. Kung (Undergrad, now medical school student at Tufts University)

High School Student Mentor, Johns Hopkins University, 2005–2006

Milan Thakor, River Hill High School (Best Overall Mentored Project in Howard County Public Schools Mathematics Science Technology Fair)

Academic Activities

Selected Attendee, The Biomedical Engineering Society (BMES), "Meet the Faculty Candidate", 2010

Awarded Attendee, NSF Rice ADVANCE Workshop, "Negotiating the Ideal Faculty Position", 2008

Peer-Reviewed Journal Articles (h-index: 13, Google Scholar)

1. B. R. Knudsen, M. L. Jepsen, **Y. P. Ho***, "Quantum Dot-Based Nanosensors for Diagnosis via Enzyme Activity Measurement," *Expert Review of Molecular Diagnostics*, 13 (4): 367-375, 2013. (**Corresponding Author*)
2. Y. Zhang, **Y. P. Ho**, Y. L. Chiu, H. F. Chan, B. Chlebina, T. Schuhmann, L. You, K. W. Leong, "A Programmable Microenvironment for Cellular Studies via Microfluidics-Generated Double Emulsions," *Biomaterials*, 34(19):4564-72, 2013.
3. P. W. Jensen, M. Falconi, E. L. Kristoffersen, A. T. Simonsen, J. B. Cifuentes, R. F. Frøhlich, J. Vagner, C. Harmsen, S. Juul, **Y. P. Ho**, J. R. Lupski, J. Koch, A. Desideri, B. R. Knudsen, M. Stougaard, "Real-time detection of TDP1 activity using a fluorophore-quencher coupled DNA-biosensor," *Biosensors and Bioelectronics*, 48: 230-237, 2013.
4. Y. L. Chiu, H. F. Chan, K. K. L. Phua, Y. Zhang, S. Juul, B. R. Knudsen, **Y. P. Ho***, K. W. Leong*, "A Novel Fluorosurfactant for Emulsion-based Biological Applications," *Small*, 2013. (*In revision, *Corresponding Author*)
5. L. B. Marcussen, M. L. Jepsen, E. L. Kristoffersen, **Y. P. Ho**, M. Stougaard and B. R. Knudsen, "DNA-Based Sensor for Real-Time Measurement of the Enzymatic Activity of Human Topoisomerase I," *Sensors*, 13: 4017-4028, 2013.
6. S. Juul, C. J. F. Nielsen, R. Labouriau, A. Roy, C. Tesauro, P. W. Jensen, C. Harmsen, E. L. Kristoffersen, Y. -L. Chiu, R. Frøhlich, P. Fiorani, J. Cox-Singh, D. Tordrup, J. Koch, A. Bienvenu, A. Desideri, S. Picot, E. Petersen, K. W. Leong, **Y. P. Ho**, M. Stougaard, B. R. Knudsen, "Droplet Microfluidics Platform for Highly Sensitive and Quantitative Detection of Malaria-Causing Plasmodium Parasites Based on Enzyme Activity Measurement," *ACS Nano*, 6(12): 10676-10683, 2012.
7. C. L. Grigsby, **Y. P. Ho**, K. W. Leong, "Understanding Nonviral Nucleic Acid Delivery with Quantum Dot-FRET Nanosensors," *Nanomedicine*, 7(4): 565-577, 2012.
8. **Y. P. Ho**, C. L. Grigsby, F. Zhao, K. W. Leong, "Tuning Physical Properties of Nanocomplexes Through Microfluidics-Assisted Confinement," *Nano Letters*, 11(5): 2178-2182, 2011.
9. S. Juul, **Y. P. Ho**, J. Koch, F. F. Andersen, M. Stougaard, K. W. Leong, B. R. Knudsen, "Detection of Single Enzymatic Events in Rare- or Single Cells Using Microfluidics," *ACS Nano*, 5(10): 8305-8310, 2011. (*Highlighted by Lab on a Chip, Chemical & Engineering News, NanotechWeb News and Aarhus University Press*)

10. Y. Wu, **Y. P. Ho**, Y. Mao, X. Wang, B. Yu, K. W. Leong and L. J. Lee, "Uptake and Intracellular Fate of Multifunctional Nanoparticles: A Comparison between Lipoplexes and Polyplexes via Quantum Dot Mediated Förster Resonance Energy Transfer," *Molecular Pharmaceutics*, 8 (5), pp 1662–1668, 2011.
11. **Y. P. Ho**, K. W. Leong, "Quantum Dot-Based Theranostics," *Nanoscale*, 2: 60-68, 2010. ([Top ten most accessed articles during January and February 2010](#))
12. V. J. Bailey, B. P. Keeley, Y. Zhang, **Y. P. Ho**, H. Easwaran, M. V. Brock, K. L. Pelosky, H. E. Carraway, S. B. Baylin, J. G. Herman, T. H. Wang, "Enzymatic Incorporation of Multiple Dyes for Increased Sensitivity in QD-FRET Sensing for DNA Methylation Detection," *ChemBioChem*, 11(1): 71-74, 2010.
13. **Y. P. Ho**, H. H. Chen, K. W. Leong, T. H. Wang, "Combining QD-FRET and Microfluidics to Monitor DNA Nanocomplex Self-Assembly in Real-Time," *Journal of Visualized Experiments, JoVE* 30. <http://www.jove.com/index/details.stp?id=1432>, doi: 10.3791/1432, 2009.
14. H. H. Chen*, **Y. P. Ho***, X. Jiang, H. Q. Mao, T. H. Wang, K. W. Leong, "Simultaneous Non-invasive Analysis of DNA Condensation and Stability by Two-step QD-FRET," *Nano Today*, 4: 125-134, 2009. (***Equal Contribution**)
15. **Y. P. Ho**, H. H. Chen, K. W. Leong, T. H. Wang, "The Convergence of Quantum-Dot-mediated Fluorescence Resonance Energy Transfer and Microfluidics for Monitoring DNA Polyplex Self-Assembly in Real Time," *Nanotechnology*, 20: 095103, 2009. ([Highlighted by NanotechWeb News](#))
16. H. C. Yeh, C. M. Puleo, **Y. P. Ho**, V. J. Bailey, T. C. Lim, K. Liu, T. H. Wang. "Tunable Blinking Kinetics of Cy5 for Precise DNA Quantification and Single-Nucleotide Difference Detection," *Biophysical Journal*, 95: 729-737, 2008.
17. H. H. Chen, **Y. P. Ho**, X. Jiang, H. Q. Mao, T. H. Wang, K. W. Leong, "Quantitative Comparison of Intracellular Unpacking Kinetics of Polyplexes by a Model Constructed from Quantum Dot-FRET," *Molecular Therapy*, 16: 324-332, 2008.
18. T. C. Lim, V. J. Bailey, **Y. P. Ho**, T. H. Wang, "Intercalating Dye as an Acceptor in Quantum Dot Mediated FRET," *Nanotechnology*, 19: 075701-075707, 2008.
19. S. Y. Chao, **Y. P. Ho**, V. Bailey, T. H. Wang, "Quantification of Low Concentration DNA Using Single Molecule Detection and Velocity Measurement in a Microchannel," *Journal of Fluorescence*, 17(6): 767-774, 2007.
20. H. C. Yeh, C. Puleo, T. C. Lim, **Y. P. Ho**, P. Giza, R. C. Huang, T. H. Wang, "A Microfluidic-FCS Platform for Investigation on the Dissociation of Sp1-DNA Complex by Doxorubicin," *Nucleic Acids Research*, 34(21): e144, 2006.
21. **Y. P. Ho**, H. H. Chen, K. W. Leong, T. H. Wang, "Evaluating the Intracellular Stability and Unpacking of DNA Nanocomplexes by Quantum Dots-FRET," *Journal of Controlled Release*, 116:83-89, 2006. ([Jorge Heller Outstanding Paper Award](#))
22. H. C. Yeh, **Y. P. Ho**, I. M. Shih, T. H. Wang, "Homogeneous Point Mutation Detection by Quantum Dot-Mediated Two-color Fluorescence Coincidence Analysis," *Nucleic Acids Research*, 34(5): e35, 2006.
23. **Y. P. Ho**, M. C. Kung, S. Yang, T. H. Wang, "Multiplexed Hybridization Detection with Multicolor Colocalization of Quantum Dot Nanoprobes," *Nano Letters*, 5(9): 1693-1697, 2005.
24. **Y. P. Ho**, M. Wu, H. Y. Lin, W. Fang, "A Robust and Reliable Stress-induced Self-assembly Supporting Mechanism for Optical Devices," *Microsystem Technologies*, 11:214-220, 2005.
25. H. C. Yeh, **Y. P. Ho**, T. H. Wang, "Quantum Dot-Mediated Biosensing Assays for Specific Nucleic Acid Detection," *Nanomedicine*, 1(2): 115-121, 2005.
26. H. C. Yeh, S. Y. Chao, **Y. P. Ho**, T. H. Wang, "Single-Molecule Detection and Probe Strategies for Rapid and Ultrasensitive Genomic Detection," *Current Pharmaceutical Biotechnology*, 6(6): 453-461, 2005.

Book Chapter

1. K. Liu, **Y. P. Ho**, T. H. Wang, "Nanoparticle-Based Sensor Assemblies for Biomolecules Detection," in *Bottom-Up Nanofabrication: Supramolecules, Self-Assemblies, and Organized Films*; K. Ariga, H. S. Nalwa, Eds, American Scientific Publishers, 2007 (ISBN: 1-58883-079-9).

Patents

1. **Y. P. Ho**, I. Batinic-Haberle, A. Tovmasyan, E. Roberts and K. W. Leong, "Sustained intratumoral release, from the microparticles, of the therapeutic strategy based on coupling of two redox-active agents resulting in cytotoxic hydrogen peroxide formation", 2013 (Invention Disclosure).
2. **Y. P. Ho**, C. L. Grigsby and K. W. Leong, "Microfluidics Assisted Synthesis of Gene Loaded Nanocomplexes," 2011 (Invention Disclosure).
3. **Y. P. Ho**, K. W. Leong, S. Juul, J. Koch, M. Stougaard, F. F. Andersen and B. R. Knudsen, "Enzyme Detection By Microfluidics," 2011 (U.S. Provisional Patent No. 61/529,352; Danish Priority-Patent No. PA 2011 70487).

4. T. H. Wang and Y. P. Ho, "Fluorescence Self-amplification Facilitated by Molecular Nanoprobes and Micro Concentration Devices for Rapid and Ultrasensitive Biological Detection," 2004 (U.S. provisional patent).

Invited and Contributed Talks

1. **Invited Talk**, *Towards Single Cell Diagnostics: Combining DNA Nanosensors and Microfluidics for Disease Diagnosis*, Graduate Seminar, Department of Biomedical Engineering, Michigan Technological University, USA, 2013.
2. **Guest Lecture**, *Introduction to Micro- and Nano-fluidics*, Current Nanoscience, Aarhus University, Denmark, 2013.
3. **Guest Lecture**, *Single Cell Analysis in Droplet Microfluidics*, Nanomedicine, Aarhus University, Denmark, 2013.
4. **Guest Lecture**, *Quantum Dot-Based Theranostics*, Nanomedicine, Aarhus University, Denmark, 2013.
5. **Guest Lecture**, *Quantum Dots for Non-viral Delivery*, Applied Molecular biology, Aarhus University, Denmark, 2013.
6. **Guest Lecture**, *Quantum Dot-Based Biosensors*, Bionanotechnology, Aarhus University, Denmark, 2012.
7. **Invited Talk**, *Towards Single Cell Cancer Diagnostics*, iNANO Autumn School, Aarhus University, Denmark, 2012.
8. **Invited Talk**, *Nanophotonics and Microfluidics: Joining Force to Promote Nanomedicine*, Institute of Systems Neuroscience, National Tsing-Hua University, Taiwan, 2012.
9. **Guest Lecture**, *Quantum Dot-Based Theranostics*, Biomedical Polymers (BME 265.02), Duke University, USA, 2012.
10. **Invited Talk**, *Microfluidics-Assisted Synthesis of Gene-Loaded Nanocomplexes*, Mini-symposium on Cancer Nanotechnology, Physical Sciences-Oncology Center (PS-OC) and Center of Cancer Nanotechnology Excellence (CCNE), Johns Hopkins Institute for NanoBioTechnology, USA, 2012
11. **Invited Talk**, *Convergence of Nanophotonics and Microfluidics for Nanomedicine in Theranostics*, Department of Mechanical & Automation Engineering, Chinese University of Hong Kong, 2012.
12. **Invited Talk**, *Nanophotonics and Microfluidics: Joining Force to Promote Nanomedicine*, Department of Mechanical and Biomedical Engineering, City University of Hong Kong, 2012.
13. **Distinguished iNANO Lectures**, *Convergence of Nanophotonics and Microfluidics for Nanomedicine in Theranostics*, Interdisciplinary Nanoscience Center, Aarhus University, Denmark, 2011.
14. **Guest Lecture**, *Quantum Dot-Based Theranostics*, Topics in Nanomedicine (BME 265.03), Duke University, 2011.
15. **Invited Talk**, *Integration of Nanophotonics and Microfluidics for Nanomedicine*, Mechanical Engineering, Department of Mechanical Engineering, Vanderbilt University, USA, 2011.
16. **Invited Talk**, *Integration of Nanophotonics and Microfluidics for Nanomedicine*, Institute of Cellular and Organismic Biology, Academia SINICA, Taiwan, 2011.
17. **Oral Presentation**, *Unexpected Properties of Polymeric DNA-Nanocomplexes Synthesized in Picoliter Droplets*, The 6th Annual IEEE International Conference on Nano/Micro Engineered and Molecular Systems (IEEE NEMS), Kaohsiung, Taiwan, 2011. (*Finalist of Best Conference Paper Award*)
18. **Guest Lecture**, *Quantum Dot-Based Theranostics*, Topics in Nanomedicine (BME 265.02), Duke University, 2010.
19. **Oral Presentation**, *DNA Nanocomplexes Synthesized in a Microfluidic Droplet Generator*, The Biomedical Engineering Society Annual Meeting (BMES), Austin, USA, 2010.
20. **Invited Talk**, *Single Molecule Biosensing with Quantum Dots for Nanomedicine in Diagnostics and Therapeutics*, Department of Power Mechanical Engineering, National Tsing-Hua University, Taiwan, 2009.
21. **Oral Presentation**, *Quantitative Kinetic Analysis Of DNA Nanocomplex Self-Assembly With Quantum Dots FRET In A Microfluidic Device*, IEEE International Conference on Micro Electro Mechanical Systems (IEEE MEMS), Tucson, USA, 2008. (*IEEE MEMS Student Travel Award*)
22. **Oral Presentation**, *Multiplexed Detection of Anthrax Sequences with Quantum Dot Nanoprobes*, IEEE/NLM Life Science Systems and Application Workshop (LSSA), NIH, Bethesda, USA, 2006.

Selected Conference Proceedings (Out of 43)

1. E. L. Kristoffersen, A. Ottaviani, M. Juul Nielsen, M. B. Andersen, M. L. Jepsen, S. Juul and Y. P. Ho*, "Combining DNA Nanosensors and Droplet Microfluidics for Point-of-Care Diagnosis," International Conference on Nanoscience and Technology, China 2013 (ChinaNANO 2013), Beijing, China, 2013. (*Oral Presentation, *Corresponding Author*)
2. S. Juul, C. Harmsen, M. J. Nielsen, M. Stougaard, K. W. Leong, B. R. Knudsen and Y. P. Ho*, "Single Cell Enzyme Diagnosis on the Chip," 26th IEEE International Conference on Micro Electro Mechanical Systems (IEEE MEMS 2013), Taipei, Taiwan, 2013. (**Corresponding Author*)
3. Y. P. Ho, C. L. Grigsby and K. W. Leong, "Microfluidics-Assisted Synthesis of Gene-Loaded Nanocomplexes," Microfluidics, Physics & Chemistry of, Gordon Research Conference, Waterville Valley, USA, 2011.

4. **Y. P. Ho**, Y. Duan, F. Zhao, K. W. Leong, "Controlled Synthesis of DNA Nanocomplexes In A Microfluidic Device," Biophysical Society 54th Annual Meeting & 18th International Biophysics Congress, San Francisco, USA, 2010.
5. **Y. P. Ho**, H. H. Chen, K. W. Leong, T. H. Wang, "Spatially-Resolved Analysis of DNA Nanocomplex Self-Assembly Enabled by Integrating Nanophotonics and Microfluidics," Kewaunee Event, Duke University, Durham, USA, 2009. (*Kewaunee Best Poster Award*)
6. **Y. P. Ho**, H. H. Chen, K. W. Leong, T. H. Wang, "Single Particle QD-FRET: Evaluation of the Stability and Composition of Nanocomplexes for Gene Delivery," The Eighth Fitzpatrick Institute for Photonics Annual Meeting on Frontiers in Photonics Science and Technology, 2008.
7. **Y. P. Ho**, K. Murray, T. H. Wang, "An Electrokinetic-based Sample Processing Chip for Concentration and Lysis of Cells," The Biomedical Engineering Society Annual Meeting (BMES), Chicago, USA, 2006.
8. **Y. P. Ho**, M. C. Kung, T. H. Wang, "Separation-free Detection of Low-abundant Biomolecules with Two-Color Colocalization of Quantum Dot Probes," Ninth International Conference on Miniaturized Chemical and Biochemical Analysis Systems (MicroTAS), Boston, USA, 2005. (*MicroTAS Student Travel Award*)
9. **Y. P. Ho**, M. Wu, H. Y. Lin, W. Fang, "A Robust and Reliable Stress-Induced Self-Assembly Mechanism for Optical Devices," Proceeding of IEEE/LEOS Optical MEMS, Lugano, Switzerland, 2002.

Recent Funding

Principle Investigator

Real Time Investigation of Single Cell Enzymatic Activity, 2012-2015

The Danish Council for Independent Research, Technology and Production Sciences (FTP)

The Danish Council for Independent Research, Sapere Aude, DFF-Postdoc

Principle Investigator

Probing Cancer from Single Cell, 2012-2014

Karen Elise Jensens Fond

Principle Investigator

Study and Quantitative Description of Nucleic Acid Condensation in Picoliter-Incubators, 2013-2015

The Lundbeck Foundation (Lundbeckfonden), Scientific Project, Natural Science

Principle Investigator

Real-Time Measurement of the Regulatory Factors that Modify the Activity of DNA Interacting Enzymes, 2013

Carlsberg Foundation (Carlsbergfondet), Equipment Grant