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Education

- Ph.D. of Molecular Biophysics, Perelman School of Medicine, University of Pennsylvania, USA (1992 – 1996)
- M.S. of Biochemistry/Chemistry, University of Massachusetts, USA (1990 – 1992)
- B.S. of Applied Chemistry, Tamkang University, Taiwan (1983 – 1987)

Professional Experiences

- Director, Student Affairs Office, National Health Research Institutes, Taiwan (2017 – 2019)
- Joint Professor, Department of Energy Engineering and International Master Program of Translational Medicine, College of Engineering and Science, National United University, Miaoli, Taiwan (2016 – present)
- Joint Professor, Ph.D. Program in Tissue Engineering and Regenerative Medicine, Biotechnology Center, National Chung-Hsing University, Taichung, Taiwan (2013 – present)
- Joint Professor, Graduate Institute of Life Sciences, National Defense Medical Center, Taipei, Taiwan (2013 – present)
- Visiting Senior Investigator/Visiting Professor and Director of Translational Nanotheranostics, Functional and Molecular Imaging and Theranostics (FMI&T) Research Group, Department of Radiology and the Comprehensive Cancer Center (UCCCC), The University of Chicago, IL, USA (2011 – 2015)
- Investigator, Institute of Biomedical Engineering and Nanomedicine, National Health Research Institutes, Taiwan (2010 – present)
- Joint Professor, Ph.D. Program for Aging, Graduate Institute of Basic Medical Science, China Medical University, Taichung, Taiwan (2010 – 2016)
- Adjunct Professor, Institute of Electro-Optical Engineering, National Chiao-Tung University, Taiwan (2010 – 2012)
- Director, Computing and Information Center, Department of Administration, National Health Research Institutes, Taiwan (2009 – 2010)

- Adjunct Associate Professor, Institute of Electro-Optical Engineering, National Chiao-Tung University, Taiwan (2008 – 2010)
- Associate Investigator, Division of Medical Engineering, National Health Research Institutes, Taiwan (2006 - 2010)
- Assistant Investigator, Division of Medical Engineering, National Health Research Institutes, Taiwan (2001 - 2006)
- Adjunct Assistant Professor, Institute of Biomedicine and Biomedical Technology, National Chi-Nan University, Taiwan (2001 - 2006)
- Assistant Professor, Department of Applied Chemistry, National Chi-Nan University, Taiwan (2000 - 2001)
- Postdoctoral Fellow in Cardiovascular Research, Institute of Biomedical Sciences, Academic Sinica, Taiwan (1997 - 2000)

Professional Activities, Awards and Honors

- Panelist, Grant Review Committee on Nanotechnology Division, Department of Natural Sciences and Mathematics, National Science and Technology Council, Taipei, Taiwan, 2024（國科會自然處 113 年【奈米科技學門】奈米科技創新應用主軸計劃暨臺美奈米材料基礎科學研發共同合作研究計劃複審委員）
- Panelist, Grant Review Committee on Radiology and Nuclear Medicine, Division of Engineering Medicine, Department of Life Sciences, National Science and Technology Council, Taiwan, 2023 – present（國科會生科處 112 – 114 年【工程醫學學門－放射核醫】專題計畫複審委員）
- Member, Editorial Board of the journal ***Nanomaterials*** (SCI), 2023 – present
- Member, Editorial Board of the journal: ***Journal of Nanotheranostics***, 2021 – present
- Guest Editor for the journal: ***Nanomaterials*** (SCI), Special Issue "*Nanomaterials for Biophotonics: Prognosis and Therapeutics*", 2021
- Review Editor of the journal: ***Frontiers in Chemistry***- *Medicinal and Pharmaceutical Chemistry Section* (SCI), 2017 – present
- **Associate Editor** of the journal: ***Frontiers in Molecular Biosciences***- *Molecular Diagnostics and Therapy Section* (SCI), 2013 – present
- Associate Editor of the journal: ***Frontiers in Bioengineering and Biotechnology***- *Nanobiotechnology Section* (SCI), 2024 – present
- Member, Senior Editorial Board of the journal: ***American Journal of Nuclear Medicine and Molecular Imaging (AJNMMI)***, 2013 – present
- Member, Editorial Board of the journal: ***Advances in Biomaterials***, 2013 – present
- Member, Advisory Board of the journal: ***Mesoporous Biomaterials***, 2013 – present
- **Senior and Founding Member**, Editorial Board of the journal: ***Theranostics*** (SCI)

(Impact Factor: 13.3; Top 5% in Research and Experimental Medicine), 2011 – present

- Recipient of 3-year Innovation and Application of Nanoscience Thematic Program, （二度獲國科會奈米科技創新應用主軸計劃）, National Science and Technology Council, Taiwan, 2025-2028
- Nominated Member, *Sigma Xi The Scientific Research Honorary Society*（Sigma Xi 科學研究榮譽協會）, Research Triangle Park, NC, USA, since 2025
- Lifetime IAAM Fellow (Lifetime FIAAM), selected and honored by International Association of Advanced Materials（國際先進材料學會終身會士）, Sweden, 2023
- IAAM Scientist Medal, awarded by International Association of Advanced Materials（國際先進材料學會科學家獎章）, Sweden, 2023
- Outstanding Technology Award（台灣奈米醫學學會傑出技術獎）, Taiwan Nanomedicine Society, Taiwan, 2023
- 2022 Taipei Biotech Awards/Technology Transfer Special Mention Award（台北生技獎技轉合作優等獎）, Taiwan, 2022
- IAAM Fellow (FIAAM), endowed by International Association of Advanced Materials（國際先進材料學會會士）, Sweden, since 2021
- 18th National Innovation Excelsior Award（國家新創精進獎）, Taiwan, 2021
- 17th National Innovation Excelsior Award（國家新創精進獎）, Taiwan, 2020
- 16th National Innovation Award（國家新創獎）, Taiwan, 2019
- Future Tech Award (FUTEX)（科技部未來科技突破獎）, Highlighted Technology（亮點技術）, Ministry of Science and Technology, Taiwan, 2019
- Tech Innovation Excellent (TIE) Award (Bronze Medal), Taiwan Innotech Expo（台灣創新技術博覽會銅質獎）, Taiwan, 2018
- Recipient of 3-year Innovation and Application of Nanoscience Thematic Program, （科技部奈米科技創新應用主軸計劃）, Ministry of Science and Technology, Taiwan, 2018-2021
- NHRI Outstanding Research Achievement Award（國家衛生研究院傑出研究成就獎）, Taiwan, 2016
- Recipient of the Dragon Gate Program (Partnership program for the Connection to the top labs in the world) （國科會龍門計劃）, Mission-Oriented Research Grant for Overseas Research, National Science Council, Taiwan, 2012-2014
- NHRI Yang Investigator Research Achievement Award（國家衛生研究院年輕研究學者獎）, Taiwan, 2009
- The Excellent Research Award (Instructor), honored by the Foundation of Taiwan Medical Development, Taiwan, 2003
- NHRI Postdoctoral Fellowship Award, Taiwan, 1998

- Academia Sinica Postdoctoral Scholar, Taiwan, 1998 – 2000
- Biomedical Graduate Program Fellowship, Perelman School of Medicine, University of Pennsylvania, USA, 1994 – 1996
- Predoctoral Fellowship of Tumor Metabolism Program, Department of Radiation Oncology, Perelman School of Medicine, University of Pennsylvania, USA, 1993 – 1994
- Outstanding Teaching Assistant Award, Department of Chemistry, University of Massachusetts, USA, 1991-1992

- Reviewer of over 50 International Peer-reviewed Journals, including top-tier journals such as ACS Nano, Advanced Functional Materials, Advanced Materials, Advanced Science, Angewandte Chemie International Edition, Biomaterials, and Journal of the American Chemical Society, Nano Letters, Nano Research, Nanoscale, Nano Today, **Nature Communications**, **Nature Materials**, **Nature Nanotechnology**, **Nature Photonics**, Small, etc.

- Panelist, Grant Review Committee on Nanotechnology Division, Department of Natural Sciences and Mathematics, National Science and Technology Council, Taipei, Taiwan, 2024 - to date（國科會自然處 113一迄今【奈米科技學門】奈米科技創新應用計畫複審委員）
- Panelist, Grant Review Committee on Radiology and Nuclear Medicine, Division of Engineering Medicine, Department of Life Sciences, National Science and Technology Council, Taiwan, 2023 - to date（國科會生科處 112一迄今【工程醫學學門－放射核醫】專題計畫複審委員）
- Reviewer for Academic Summit Program, Ministry of Science and Technology (MOST)（科技部/學術攻頂計劃審查委員）, Taiwan, 2021
- External Reviewer for the Academia Sinica Investigator Award Grant (中央研究院深耕計劃審查委員), Taiwan, since 2020
- External Reviewer for Y.S.P. SAH Excellent Paper Award, Tien Te Lee Biomedical Foundation (永信李天德醫藥基金會/東南亞傑出論文獎審查委員), Taiwan, since 2020
- External Reviewer for ***Swiss Cancer League, Swiss Cancer Research***, Berne, ***Switzerland***, since 2019
- External Reviewer for France-Switzerland Joint Program, ***Swiss Academy Engineering Sciences SATW***, Zürich, ***Switzerland***, since 2018
- External Reviewer for ***Breast Cancer Now***, London, ***United Kingdom***, since 2016
- External Reviewer for National Taiwan University/Academia Sinica Innovative Joint Program (台灣大學/中央研究院創新性合作研究計畫審查委員), Taiwan,

since 2016

- External Reviewer for Y. Z. Hsu Scientific Award (有庠科技獎審查委員), Taiwan, since 2016
- External Reviewer for National Yang-Ming University Outstanding Research Achievement Award (國立陽明大學教師學術卓越獎審查委員), Taiwan, since since 2016
- External Reviewer for the Biomedical Innovation, French National Research Agency **(ANR)**, ***France***, since 2015
- External Reviewer for the Advanced Materials grant, Chemical & Physical Sciences Division, Netherland Organization for Scientific Research (**NWO**), ***Netherland***, since 2015
- Reviewer for Science Vanguard Research Program, Ministry of Science and Technology (MOST)（科技部/卓越領航計劃審查委員）Taiwan,, 2015
- External Reviewer, Academia Sinica Career Development Award, Taiwan, since 2015
- Reviewer for Medical Research Council (**MRC**), ***United Kingdom***, since 2014
- Examiner, Center for Research, **Anna University**, Chennai, ***India*** (Ranked 7th best University in India), since 2014
- Reviewer for Innovation and Application of Nanoscience Thematic Program, Ministry of Science and Technology (MOST)（科技部/奈米科技創新應用主軸計劃審查委員), Taiwan,, 2014
- Invited Academic Expert, Maturation and Accelerating Translation with Industry (**MATWIN**) Program, ***France***, since 2013
- External Experts for GreTai/Over-the-Counter Securities Market (財團法人中華民國櫃檯買賣中心創櫃板產業外部專家), Taiwan, since 2013
- External Reviewer, National Taiwan University-Career Development Award, Taiwan, since 2013
- Reviewer for Hong Kong Research Grants Council (**RGC**), ***Hong Kong***, since 2012
- Reviewer of National Program on Nano Technology (NPNT), Ministry of Science and Technology/National Science Council, (科技部/國家科學委員會-奈米國家型計劃生醫農學應用領域複審評議委員), Taiwan, 2012
- Official Member, Review Committee, Special Material, National Health Insurance Administration, Ministry of Health and Welfare (衛生福利部中央健康保險署 特殊醫材專家小組), Taiwan, 2010-2012
- Member, Review Committee of Intellectual Property Management, National Health Research Institutes, Taiwan, 2010
- Reviewer of the Interdisciplinary Research Program Project, Division of Medical Engineering, Department of Life Sciences, National Science Council, Taiwan, 2009

- Reviewer of the Industry-University Cooperative Research Program Project, National Science Council, Taiwan, 2002

Memberships in Professional and Scientific Societies

- Taiwan Nanomedicine Society (TNS), member since 2018
- Materials Research Society, member since 2016
- Society for Molecular Imaging, member since 2006
- American Chemistry Society, member since 2005
- Biophysical Society, member since 2003
- World Association for Chinese Biomedical Engineers, member since 2003
- SPIE, The International Society for Optical Engineering, member since 2002
- Chinese Chemistry Society, member since 2000
- ISOTT, International Society of Oxygen Transport to Tissue, member, 1994 – 2003

Lectures and Seminars by Invitation

- **Keynote Speech:** "Minimalism" paradigms in cancer photo-nanotheranostics. *2nd International Connect & Expo on Materials Science and Engineering* (MATERIALSCONNECT2026), Osaka, Japan, April 20-22, 2026.
- **Plenary Speech:** "Minimalism" paradigms in cancer photo-nanotheranostics. *3rd International Experts Summit on Nanotechnology, Nanomaterials and Polymer Science* (IESNNP 2025), Tokyo, Japan, September 17-19, 2025.
- "Minimalism" paradigms in cancer photo-nanotheranostics. *The Promise of Nanotechnology in Precision Medicine*, National Taiwan University, Taipei, Taiwan, June 26, 2024.
- **Award Acceptance Speech:** Minimalism designs of nanotheranostics: examples for cancer phototherapy and anti-obesity drug. *IAAM Scientist Medal Lecture, American IAAM Fellow Summit*, Orlando, USA, November 9-12, 2023.
- **Award Acceptance Speech:** An anti-obesity nanotechnology to modulate oil absorption *in vivo*. *Outstanding Technology Award Lecture, International Conference on Precision Nanomedicine in Theranostics & The 2023 Annual Meeting of Taiwan Nanomedicine Society (TNS)*, Taichung, Taiwan, July 21-22, 2023.
- Minimalism is the practical fashion of nanotheranostics. *35th European Advanced Materials Congress (EAMC-2021)*, Stockholm, Sweden, March 22-24, 2022 (*Held Online*).
- Minimalism is the practical fashion of nanotheranostics. *IAAM Fellow Lecture*, *Advanced Materials Lecture Series*, *International Association of Advanced Materials*, Sweden, September 16, 2021 (*Held Online*)

- Minimalism is the practical fashion of nanotheranostics. *International Conference on Precision Nanomedicine in Theranostics & The 2021 Annual Meeting of Taiwan Nanomedicine Society*, Tainan, Taiwan, August 20-21, 2021.
- Minimalism is the practical fashion of nanotheranostics. *International Conference on Advances in Functional Materials in UCLA (AAAFM-UCLA)*, University of California, Los Angeles, USA, August 18-20, 2021 (*Held Online*).
- The simpler the better in nano. *2019 Biomedical Research Symposium of National Health Research Institutes, Session IB: Medical Engineering*, Zhunan, Taiwan, August 14-15, 2019.
- Precision control of large-scale green synthesis of biodegradable gold nanodandelions as potential radiotheranostics. *16th International Conference on Nanosciences & Nanotechnologies (NN19)*, Thessaloniki, Greece, July 2-5, 2019.
- An anti-obesity nanotechnology to modulate oil absorption *in vivo*, *6th Nano Today Conference*, Lisbon, Portugal, June 16-20, 2019.
- An anti-obesity nanotechnology, *2018 Annual Meeting of Chinese Chemical Society*, National Sun Yat-sen University, Kaohsiung, Taiwan, December 8-9, 2018.
- Precision radio-nanotheranostics to modulate a comprehensive photodynamic effect for deep-seated cancer therapy, *4th Biomedical Engineering Conference*, Osaka, Japan, October 16-17, 2017.
- Seeing better and going deeper with cancer nanotheranostics, *Department of Materials Science and Engineering, National Tsing Hua University*, Hsinchu, Taiwan, May 12, 2017.
- Seeing better and going deeper with cancer nanotheranostics. *2016 MRS (Materials Research Society) Fall Meeting and Exhibit* – Session BM2: Stimuli Responsive Organic and Inorganic Nanomaterials for Biomedical Applications and Biosafety, Boston, Massachusetts, USA, November 27 - December 2, 2016.
- Seeing better and going deeper with cancer nanotheranostics. *2015 International Conference on Nanospace Materials (ICNM): from Fundamental to Advanced Applications*, Taipei, Taiwan, June 23-25, 2015.
- Seeing better and going deeper: examples in cancer nanotheranostics. *The 1st Cross-Strait Nano-Biophotonics Conference-2014*, National Taiwan University, Taipei, Taiwan, October 27-28, 2014.
- 3-in-1 silica-nanoparticles for cancer theranostics: from promise to practice. *2013 Annual Meeting of Chemical Society Located in Taipei*, National Chi Nan University, Puli, Taiwan, November 22-24, 2013.
- The interplay of molecular imaging and targeted inorganic nanotherapeutics. Session of 7-7: Image-guided Drug Delivery, *BIT's 3rd Annual Symposium of Drug*

Delivery Systems-2013, Hainan International Convention & Exhibition Center, China, November 13-16, 2013.

- 3-in-1 silica-nanoparticles for cancer theranostics: from promise to practice. Department of Chemistry, National Cheng-Kung University, Tainan, Taiwan, June 11, 2013.
- **Keynote Speech:** 3-in-1 silica-nanoparticles for cancer theranostics: from promise to practice. Pharmaceutical technology solutions for new drug development. *The 42nd Annual Meeting of Korean Society of Pharmaceutical Sciences and Technology (KSPST)*, Gwangju City, South Korea, November 29 – 30, 2012.
- Silica-based nanotheranostics: trio of imaging, delivery and therapy. Department of Chemical Engineering, National Taiwan University, Taipei, Taiwan, May 3, 2012.
- Clinical translation of silica-nanotheranostics for cancer: from promise to practice. *2012 Symposium of New Formulation for Targeting Nano-Drugs*. National Dong Hwa University, Hualien, Taiwan, April 28 – April 29, 2012.
- 3-in-1 silica-nanoparticles for cancer theranostics. *9th Taiwan/US Air Force Nanoscience Workshop*, Kenting Town, Pingdong, Taiwan, April 17 – April 19, 2012.
- Tri-functionalization of silica-nanoparticles for *in vivo* cancer theranostics: orchestrating imaging, targeting and therapy. Department of Engineering and System Science, National Tsing Hua University, Hsinchu, Taiwan, January 4, 2012.
- Tri-functionalization of silica-nanoparticles for *in vivo* cancer theranostics: orchestrating imaging, targeting and therapy. Institute of Biophotonics, National Yang-Ming University, Taipei, Taiwan, October 13, 2011.
- **Plenary Speech:** Tri-functionalization of silica-nanoparticles for *in vivo* cancer theranostics: orchestrating imaging, targeting and therapy. *The Eighth IEEE International Symposium on Biomedical Imaging: From Nano to Micro (ISBI 2011)-Special Session/The Medical Physics Seminar Series of The University of Chicago*, Chicago, USA, March 30 - April 2, 2011.
- Silica nanoparticle-mediated cancer theranostics—challenges and opportunities in clinical translation. *The 2nd World Conference on Nanomedicine and Drug Delivery (WCN-2011)*, Kottayam, Kerala, India, March 11-13, 2011.
- Nanoparticle-facilitated photodynamic therapy. *The 2nd Cross-Strait Biomedical Photonics Conference-2011*, National Cheng-Kung University, Tainan, Taiwan, February 20-24, 2011.
- Functionalization of silica-nanoparticles for *in vivo* cancer theranostics. *2010 Annual Meeting of Chinese Chemical Society*, National Taiwan University, Taipei, Taiwan, December 3-5, 2010.
- **Keynote Speech**, Tri-functionalization of silica-nanoparticles for in vivo cancer

theranostics: orchestrating imaging, targeting and therapy. *2010 International Symposium of Materials on Regenerative Medicine (2010 ISOMRM)*, National Health Research Institutes, Zhunan, Taiwan, November 3-5, 2010

- Intra-mesoporous silica nanoparticle energy transfer for two-photon photodynamic therapy. *The 8th Cross-Strait Electron Microscopy Conference-2010*, Hangzhou, China, October 8-14, 2010.
- Functionalization of silica-nanoparticles for *in vivo* cancer theranostics. *2010 Biomedical Research Symposium of National Health Research Institutes*, National Health Research Institutes, Zhunan, Taiwan, August 17-18, 2010.
- Investigation of cellular biology by fluorescence lifetime imaging microscopy. *Workshop for Biomedical Nano-Imaging Center*, National Synchrotron Radiation Research Center, Hsinchu, Taiwan, December 24, 2009.
- Functionalization of silica-nanoparticles for *in vivo* cancer theranostics. *BIT's 3rd World Congress of Gene-2009 (WCG-2009)*, Foshan, China, December 1-7, 2009.
- Nanotechnology in biomedical engineering. Department of Biomedical Engineering and Environmental Sciences, National Tsing Hua University, Hsinchu, Taiwan, July 23, 2009.
- Nanomedicine in biophotonics engineering. Tze-Chiang Foundation of Science and Technology, Hsinchu, Taiwan, July 21-22, 2009.
- Functionalization of silica-nanoparticles for cancer theranostics. *2009 NHRI Research Day*, National Health Research Institutes, Zhunan, Taiwan, July 20-21, 2009.
- Functionalization of silica-nanoparticles for cancer theranostics. *2009 Ultrafast Lasers in Biomedicine*, National Cheng-Kung University, Tainan, Taiwan, May 27, 2009.
- Nanoparticles for *in vivo* biophotonics sensing and imaging. Office of Research and Development, National United University, Miaoli, Taiwan, March 25, 2009.
- *In vivo* biophotonic sensing and imaging: from microscopic, macroscopic to functional. *1st International Biophotonic Sciences (IBIS) Workshop*, National Taiwan University of Science and Technology, Taipei, Taiwan, November 5-6, 2007
- Near-infrared mesoporous silica nanoparticles for *in vivo* optical imaging. *1st Annual IEEE International conference on Nano/Molecular Medicine and Engineering*, University of Macau, Macau SAR, China, August 6-9, 2007.
- Orchestrate the multifaced biophotonics sensing and imaging *in vivo*: from microscopic, macroscopic to functional. Department of Biomedical Imaging and Radiological Sciences (BIRS), National Yang-Ming University, Taipei, Taiwan, Jun 21, 2007

- Orchestrate the multifaced biophotonics sensing and imaging *in vivo*: from microscopic, macroscopic to functional. Department and Institute of Photonics, National Chiao Tung University, Hsinchu, Taiwan, Jun 1, 2007
- *In vivo* biophotonic sensing and imaging: from microscopic, macroscopic to functional. *12th Symposium on Recent Advances in Biophysics*, National Health Research Institutes, Zhunan, Taiwan, May 23-25, 2007
- Paving the road of nanoparticle delivery *in vivo*. Department of Chemistry, National Taiwan University, Taipei, Taiwan, May 10, 2007
- *In vivo* biophotonic sensing and imaging: from microscopic to macroscopic; from functional to translational. Center for Condensed Matter Sciences, National Taiwan University, Taipei, Taiwan, December 27, 2006
- Application of fluorescence and phosphorescence lifetime measurements in biological system: from *in vitro* to *in vivo*. Department of Biomedical Imaging and Radiological Sciences (BIRS), National Yang-Ming University, Taipei, Taiwan, Jun, 2006
- Nanoparticles *in vivo*: imaging. *The Molecular Imaging Mini-Symposium at NHRI/Chang-Gung Memorial Hospital (CGMH)*, Zhunan, Taiwan, January 11, 2006
- An *in vivo* implantable dual-functional microdevice for simultaneous photoenergy transmission/detection and neurochemical delivery/analysis. *Ninth International Conference on Miniaturized Systems for Chemistry and Life Sciences*, Boston, USA, October 9-13, 2005
- *In vivo* monitoring of nanosphere on-site delivery using fiber-optic microprobe. *The SPIE International Symposium on Smart Materials, Nano-, and Micro-Smart Systems*, Sydney, Australia, December 12-15, 2004
- Application of fluorescence and phosphorescence lifetime measurements in biological system: from *in vitro* to *in vivo*. Institute of Biomedical Engineering, National Taiwan University, Taipei, Taiwan, November 23, 2004
- Quantitative molecular luminescence lifetime measurements in nanomedicine, Institute of Biophotonics Engineering, National Yang-Ming University, Taipei, Taiwan, November 27, 2003
- Oxygen-dependent quenching of phosphorescence: from *in vitro* to *in vivo*. Department of Mechanical Engineering, National Yunlin University of Science and Technology, Douliou, Taiwan, 2002
- Design of a micro-light guide system for frequency-domain lifetime measurements of oxygen-dependent quenching of phosphorescence. *International Society of Oxygen Transport to Tissue (ISOTT)*, Manchester, U.K., August 24-27, 2002

Statement of Research Expertise

Dr. Lo's major research interests converge in the field of **Translational Nanotheranostics: Precision Radio-immuno Nanotheranostics (*PRINT*) with Molecular Imaging Innovations**. It harnesses multidisciplinary approaches to advance biophotonic/radiological nanomedicine, especially in design and application of novel nanoplatforms for *in vivo* spectroscopy/sensors and the fusion of multimodality imaging-guided photothermal (PTT), photodynamic (PDT), radiodynamic (RDT), and proton therapies (PT), for cancers, cardiovascular diseases, central nervous system injuries, and metabolic diseases such as obesity.

In early 2000s (**Biophotonics period**), Dr. Lo led his team in NHRI to spearhead the first-in-class minimally-invasive neurobiophotonic microsystems and non-invasive *in-vivo* optical imaging system. Various fluorescence single molecule-detection techniques have been adopted, including fluorescence resonance energy transfer (FRET), fluorescence anisotropy, and fluorescence cross correlation spectroscopy (FCS/FCCS). An example of his works as using first-in-class neurophotonics combined with microdialysis and microlightguide system probing the blood-brain-barrier (BBB) was published in the top-ranked journal ***Analytical Chemistry*** with a very solid citation of **111** up to date.

In mid-2000s (**Nanotheranostics period**), he was a leading renowned advocate of all-in-one nanotheranostics in the international nanomedicine communities. Dr. Lo constituted tri-functionalization of novel nanoparticles, especially mesoporous silica nanoparticles (MSN), orchestrates the trio of imaging, targeted delivery and therapy. The pertaining works were published in series as two papers in ***Journal of Materials Chemistry*** with Citations **175** (**Issue Cover**) and **262**. Dr. Lo's group and collaborators were the first to report applying near-infrared (NIR) fluorescent MSN for *in vivo* optical imaging (***Advanced Functional Materials*** IF: 19/Citation: **363**). Following that, surface charge dependent hepatobiliary transport and excretion of fluorescent MSN was assessed. Two important publications indicated that judicious tailoring of the surface charge of MSNs might enable one to control both MSN rates of excretion and MSN biodistribution – a functionality that could lead their widespread clinical use as targetable contrast agents and traceable drug delivery platforms (***ACS Nano*** IF: 16/Citation: **118**) (***Biomaterials*** IF: 12.9/Citation: **369**). The work exploiting well-defined mesoporous nanostructure of MSN to modulate three-dimensional interface energy transfer for two-photon activated cancer PDT reported an unprecedented photon energy transfer efficiency of 93% (***Nano Today*** IF: 10.9/Citation: **65**). For the drug-controlled release, with substantial citations, Dr. Lo reported the novel design of intracellular pH-responsive MSN for controlled release of anticancer chemotherapeutics that was published in ***Angewandte Chemie***

International Edition (IF: 16.9/Citation: **433**).

In the last decade and half (**Radiotheranostics period**), he has been directing his research agenda to the development of nanoscintillator-mediated radiodynamic therapy, harnessing high-energy photon and particle (e.g., proton) therapies *via* the "minimalism" design concept (i.e., the simpler the better) that also further facilitates the downstream potential of translation to industry. From 2011 to 2015, Dr. Lo served as the Director of Translational Nanotheranostics in the Functional & Molecular Imaging and Theranostics (FMI&T) Group at the University of Chicago leading the transdisciplinary research collaborated with the Brain Institute at Northwestern University. With great outcomes, he continues the ensuing close collaborations with the Chicago Biomedical Consortium (CBC) to this date. Multiple important research projects combining nanotechnology, tracer methodology, molecular imaging and PDT have been carried out, e.g., the work to integrate nanoparticles with trityl tracer for electron paramagnetic resonance imaging (EPRI) for intracellular assessment of oxygenation, which was not feasible previously; and the investigation to conjugate neural stem cells with nanoparticles and radioisotopes for imaging and theranostic application in treating brain tumors, etc. These seamless collaborations that Dr. Lo spearheaded have resulted in a number of impactful publications in the top 10% ranked journals, e.g., ***Journal of Nuclear Medicine*** (SCI: 9.1/Citation: **93**), ***Small*** (IF: 12.1/Citation: **104**), and ***Theranostics*** (IF: 13.3/Citation: **87**), etc. In recent years, Dr. Lo has developed a proprietary gold nanodandelions (GND) that to enable multi-functional cancer therapies in a simplified approach (Minimalism). This effort has resulted in publications in several leading journals including ***ACS Applied Materials and Interfaces*** and **4 patents** (2 in acquisition and 2 under review). The following in-depth development of GND has been awarded with a 3-year Innovation and Application of Nanoscience Thematic Program (2025-2028) by National Science and Technology Council, Taiwan. Furthermore, Dr. Lo is holding a portfolio of **40 patents representing 17 technologies**. Amongst, the one designed with the "minimalism" concept of using the pristine MSN as an anti-obesity drug to modulate the oil absorption *in vivo* has been translated with a substantial exclusive technology transfer for commercialization in 2021.

Selected Publications (>100, * denotes Corresponding Author)

1. Hsia, Y. and Lo, L.W.* (2025) Exploiting intercellular highways: tunneling nanotubes as novel targets for nanomaterial-mediated tumor therapy. *Nanoscale Adv.* (By Invitation) (In Preparation)
2. Chu, C.H., Chuang, Y.C., Hsia, Y., Sivasubramanian, M., Yang, C.S., and Lo, L.W.* (2025) An anti-obesity nanotechnology to modulate oil absorption *in vivo*. *Sci. Transl. Med.* (In Preparation)

3. Sivasubramanian, M., Chu, C.H., Hsia, Y., Chuang, Y.C., Chen, Y.L., Liao, L.D., and Lo, L.W.* (2025) Calcium carbonate mineralized mesoporous silica nanoparticles as intracellular Ca^{2+} modulator for tumor specific ultrasound guided theranostics. *ACS Appl. Nano Mater.* (By Invitation) (In Preparation)
4. Wu, P.H., Shen, Y.A., Chuang, Y.C., Chiou, J.F., Chang, W.M., Hsia, Y., Kuo, C.C., Wang, W.J., Lo, L.W.*, and Lee, H.L.* (2025) Critical radiosensitizing parameters for clinical translation of dual-modality gold nanodandelion against cancer radioresistance in MV X-ray and Proton therapies. *Materials Today Adv.* (Under Review)
5. Chang, W.M., Lee, H.L., Lo, L.W., Chen, H.Y., Kuo, C.C., Chuang, Y.C., Wu, P.H., Chiou, J.F., Lee, K.H. and Shen, Y.A.* (2025) Targeting glutamine metabolism combined with nanoradioenhancer in radioresistant hepatocellular carcinoma. *Nanoscale* (Under Review)
6. Sivasubramanian, M., Chen, G.S.*, and Lo, L.W.* (2025) Harnessing sonodynamic nanotherapy to elicit regulated cell death pathways in cancer. *Ultrason. and Sonochem.* (By Invitation) (Under Review)
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Patents (17 main technologies with 40 associated patents**)**

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2. Chuang, Y.C., Chen, Y.P., Wu, H.M., Wang,Y.M., Lo, L.W. "Matrix metalloproteinase-directed precise targeting and smart drug delivery of biodegradable gold nanodandelions" (a) 2025 In Preparation: **Taiwan ROC**; (b) 2025 In Preparation: **Patent Cooperation Treaty (PCT)**.
3. Chuang, Y. C., Lo, L. W. "Precision control of large-scale green synthesis of biodegradable gold nanodandelions as potential radiotheranostics" (a) 「可降解花狀金奈米粒子之合成及其用於放射診斷及治療之用途」, **Taiwan ROC** Patent No. I719347; (b) 2023/12/13 Granted, US (USPTO/**PCT)** (17/286,439).
4. Cheng, S. H., Laio, W. N., Yang, C. S., Lo, L. W. "Mesoporous silica nanoparticles for oil absorption", (a) **Taiwan ROC** Patent No. I614017; (b) **US (USPTO)** No. US9,185,928 B2; (c) **Patent Cooperation Treaty (PCT)** No. WO 2014/100522 A1; (d) **Europe (EPO)** patent No. EP2934495 (Germany, United Kingdom, France, Spain, Italy); (e) **China** patent No. CN104955446; (f) **Australia** 2018/09/20 No. AU2013361217 A1; (g) **Canada** No. 2,895,357; (h) **New Zealand** 2020/05/01 NZ709368.
5. Lo, L. W.; Yang, C. S.; Chen, P. R.; Tsai, P. J. "A biodegradable material with nanopores and electric conductivity and the fabricating method thereof" (a) **Taiwan ROC** Patent No. TW200829641; (b) **US (USPTO)** Patent No. US 20,080,166,540; (c) **Europe (EPO)** Patent No. 1970077 (United Kingdom).
6. Lo, L. W.; Yang, C. S. "Blood flow control system, Tension adjustable Instrument and Method Thereof" (a) **Taiwan ROC** Patent No. I377960; (b) **US (USPTO)** Patent No. US8,226,596.
7. Lin, S. Y.; Lo, L. W.; Yang, C. S. "Method for making a ligand-quantum dot conjugate" (a) **Taiwan ROC** Patent No. I392869; (b) **US (USPTO)** Patent No. US 8,216,549.

8. Lee, C. H.; Mou C. Y.; Lo, L. W.; Yang, C. S. “Drug delivery system” (a) **Taiwan ROC** Patent No. I394583 (b) **US (USPTO)** Patent No. US 8,252,337.
9. Tai, L. A.; Lo, L. W.; Yang, C. S.; Wang, Y. J.; Wu, Y. T.; Wang, Y. C. “Transdermal Delivery Nanocapsules” (a) **Taiwan ROC** Patent No. I371290; (b) **US (USPTO)** Patent No. US 8,062,663.
10. Lee, C. H.; Cheng, S. H.; Liao, W, N.; Chen, J. K.; Yang, C. S.; Lo, L. W.; Hwu, Y.; Lin, F. S. “Solid phase gold nanoparticle synthesis” (a) **Taiwan (ROC)** Patent No. I445664; (b) **US (USPTO)** Patent No. US 8,734,844.
11. Lo, L. W.; Yang, C. S. “Implantable Microdevice for detecting, activating and delivering molecules” **US (USPTO)** filed on 2007/10/09 with filing number: 11/869,053.
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13. Lo, L. W.; Yang, C. S. “Blood flow control system, Tension adjustable Instrument and Method Thereof” (a) **US (USPTO)** issued on 2012/07/24 with patent number: US8,226,596; (b) **Taiwan (ROC)** patent issued on 2012/12/01 with patent number: I 377960.
14. Lin, S. Y.; Lo, L. W.; Yang, C. S. “Method for making a ligand-quantum dot conjugate” (a) **US (USPTO)** issued on 2012/07/10 with patent number: US8,216,549; (b) **Taiwan (ROC)** issued on 2013/04/11 with patent number: I 392869.
15. Tai, L. A.; Lo, L. W.; Yang, C. S.; Wang, Y. J.; Wu, Y. T.; Wang, Y. C. “Methods and compositions for enhancing transdermal drug delivery” (a) **US (USPTO)** issued on 2011/11/22 with patent number: US 8,062,663; (b) **Taiwan (ROC)** patent issued on 2012/09/01 with patent number: I 371290.
16. Lee, C. H.; Mou C. Y.; Lo, L. W.; Yang, C. S. “Charged mesoporous slica nanoparticle-based drug delivery system for controlled release and enhanced bioavailabity” (a) **US (USPTO)** issued on 2012/08/28 with patent number: US8,252,337.; (b) **Taiwan (ROC)** patent issued on 2013/05/01 with patent number: I 394583.
17. Lee, C. H.; Cheng, S. H.; Liao, W, N.; Chen, J. K.; Yang, C. S.; Lo, L. W.; Hwu, Y.; Lin, F. S. “Solid phase gold nanoparticle synthesis” (a) **US (USPTO)** filed on 2011/05/17 with filing number: 13/109,438; (b) **Taiwan (ROC)** filed on 2011/0/18 with filing number: 100117467.

Current-Year Research Support

2025 Ongoing Research Support

(1) *National Science and Technology Council (NSTC)*/Innovation and Application of Nanoscience Thematic Program: 114-2124-M-400-001 (2025-2028) Role: PI
Green Chemistry-derived Nanodandelion Sensitizing Photothermal and Radiodynamic/Proton Immunotherapy

(2) *National Science and Technology Council (NSTC)*/Recruiting Visiting Scholars/Technology Professionals: 114-2811-M-400-00 (2025-2026) Role: PI
Green Chemistry-derived Nanodandelion Sensitizing Photothermal and Radiodynamic/Proton Immunotherapy

(3) *National Science and Technology Council (NSTC)*/Department of Engineering and Technologies: 114-2221-E-400-002-MY3 (2025-2028) Role: PI
Physicochemical controls of ferroptosis-boosted immunogenic sonodynamic nanotherapy orchestrated by sonosomes to subvert therapeutic barriers in pancreatic cancer

(4) *National Health Research Institutes (NHRI)* Intramural Grant: BN-114-PP-04 (2025-2028) Role: PI
Robust engineering of tumor infiltrating macrophages to reduce glioma progression by immuno-sonodynamic therapy

(5) *National Health Research Institutes (NHRI)* Extramural Grant: NHRI-EX114-11404EI (2025-2027) Role: Co-PI
Application of PBX1 Inhibitors Derived from Mesoporous Silica Nanoparticles to Overcome the Cancer Stem Cell Properties Induced by Gemcitabine in Chemoresistant Pancreatic Cancer Cells

(6) *National Health Research Institutes (NHRI) – National Tsing Hua University (NTHU)* Joint Grant: BN-113-SP-15 (2024-2025) Role: Co-PI
Theranostic Polypyrrole-Functionalized Mesoporous Silica Core-Shell Nanostructures with Highly Amplified NIR-II Absorption for Photoacoustic Image-Guided Photothermal Cancer Therapy