

# Yeukuang Hwu

## List of Publications

Citation statistics: (2020/12/22)

Google Scholar: total citation: 8019, *h*-index: 47, *i10*-index: 197

ISI: total publication: 305, citation: 6002, *h*-index: 41, Average citation per item: 19.59

1. Yeukuang Hwu and Giorgio Margaritondo: "Synchrotron Radiation and Sensors: a History of Synergies", *IEEE Sensors Journal*, (accepted): <https://doi.org/10.1109/JSEN.2020.3023292>.
2. Shin-Ruen Yang, Kuo-Feng Hua, Lichieh Julie Chu, Yeu-Kuang Hwu, Shun-Min Yang, Chung-Yao Wu, Tsai-Jung Lin, Jui-Chun Weng, Hailin Zhao, Wan-Han Hsu, Feng-Cheng Liu, Wen-Jinn Liaw, Daqing Ma, Shuk-Man Ka, Ann Chen: "Xenon blunts NF- $\kappa$ B/NLRP3 inflammasome activation and improves acute onset of accelerated and severe lupus nephritis in mice", *Kidney International* **98**, 378-390 (2020). <https://doi.org/10.1016/j.kint.2020.02.033>.
3. An-Lun Chin, Shun-Min Yang, Hsiang-Hsin Chen, Min-Tsang Li, Tsung-Tse Lee, Ying-Jie Chen, Ting-Kuo Lee, Cyril Petibois, Xiaoqing Cai, Chian-Ming Low, Francis Chee Kuan Tan, Alvin Teo, Eng Soon Tok, Edwin B.L. Ong, Yen-Yin Lin, I-Jin Lin, Yi-Chi Tseng, Nan-Yow Chen, Chi-Tin Shih, Jae-Hong Lim, Jun Lim, Jung-Ho Je, Yoshiki Kohmura, Tetsuya Ishikawa, Giorgio Margaritondo, Ann-Shyn Chiang, Yeukuang Hwu: "A Synchrotron X-ray Imaging Strategy to Map Large Animal Brains", *Chinese J. Phys.* **65**, 24-32 (2020).
4. Chi-Feng Huang, Wei-Hau Chang, Ting-Kuo Lee, Yasumasa Joti, Yoshinori Nishino, Takashi Kimura, Akihiro Suzuki, Yoshitaka Bessho, Tsung-Tse Lee, Mei-Chun Chen, Shun-Min Yang, Yeukuang Hwu, Shih-Hsin Huang, Po-Nan Li, Peilin Chen, Yung-Chieh Tseng, Che Ma, Tsui-Ling Hsu, Chi-Huey Wong, Kensuke Tono, Tetsuya Ishikawa, Keng S Liang: "XFEL coherent diffraction imaging for weakly scattering particles using heterodyne interference." *AIP Advances* **10** (5), 055219 (2020).
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6. Wei-Ling Chang, Hao Wu, Yu-Kun Chiu, Shuo Wang, Ting-Xin Jiang, Zhong-Lai Luo, Yen-Cheng Lin, Ang Li, Jui-Ting Hsu, Heng-Li Huang, How-Jen Gu, Tse-Yu Lin, Shun-Min Yang, Tsung-Tse Lee, Yung-Chi Lai, Mingxing Lei, Ming-You Shie, Cheng-Te Yao, Yi-Wen Chen, JC Tsai, Shyh-Jou Shieh, Yeu-Kuang Hwu, Hsu-Chen Cheng, Pin-Chi Tang, Shih-Chieh Hung, Chih-Feng Chen, Michael Habib, Randall B Widelitz, Ping Wu, Wen-Tau Juan, Cheng-Ming Chuong: "The Making of a Flight Feather: Bio-architectural Principles and Adaptation" *Cell* **179** (6), 1409-1423. e17 (2020).
7. M-T Li, S-F Lai, S-M Yang, Y-S Chen, Y-J Chen, Eng Soon Tok, Giorgio Margaritondo, Yeukuang Hwu: "Gold nano-mesh synthesis by continuous-flow X-ray irradiation", *J. Synchrotron Rad.* **26**, 1929-1935 (2019). <https://doi.org/10.1107/S1600577519011834>.
8. Li-An Chu, Chieh-Han Lu, Shun-Min Yang, Yen-Ting Liu, Kuan-Lin Feng, Yun-Chi Tsai, Wei-Kun Chang, Wen-Cheng Wang, Shu-Wei Chang, Peilin Chen, Ting-Kuo Lee, Yeu-Kuang Hwu, and Ann-Shyn Chiang, Bi-Chang Chen: "Rapid single-wavelength lightsheet localization microscopy for clarified tissue", *Nat. Comm.* **10**, 4762 (2019).
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  11. Chun-Chih Hu, Gong-Her Wu, Sheng-Feng Lai, Muniesh Muthaiyan Shanmugam, Y. Hwu, Oliver I. Wagner, Ta-Jen Yen: "Toxic Effects of Size-tunable Gold Nanoparticles on *Caenorhabditis elegans* Development and Gene Regulation", *Sci. Rep.* **8**, 15245 (2018).
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- emission Mn<sup>2+</sup>-doped quantum dots” *Biosensors & Bioelectronics* **84** 133-140 (2016)
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6. M. Cholewa, Yang Ping, Ng May Ling, Li Zhi Juan, Yeukuang Hwu, and H. O. Moser “Development and Applications of a Phase Contrast Imaging and Tomography Facility (PCIT) at Singapore Synchrotron Light Source”, *AIP Conf. Proc.* 879, 844 (2007); <https://doi.org/10.1063/1.2436192>.
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9. C. C. Chien, C. H. Wang, T. E. Hua, P. Y. Tseng, T. Y. Yang, Y. Hwu, Y. J. Chen, K. H. Chung, J. H. Je, and G. Margaritondo: “Synchrotron X-Ray Synthesized Gold Nanoparticles for Tumor Therapy”, *AIP Conf. Proc.* 879, 1908 (2007)
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  20. G. H. Fecher, M. Huth, **Y. Hwu**, W. Swiech: “Photoemission micro-imaging and spectroscopy of devices made from complex materials”; Eds. H. A. C. Benavides and M. J. Yacaman *Electron Microscopy 1998*, Vol. II Materials Science 1, p.321; IOP, Bristol and Philadelphia (1998).
  21. **Yeukuang Hwu**, C. Y. Tung, Hong-Ming Lin, G. M. Moog, W. C. Goh, C. K. Lin, T. S. Cho and J. H. Je, “Phase Differentiation and Characterization of Nanostructured Metal Composites by Synchrotron Radiation Techniques ”, *Engineering Chemistry & Metallurgy*, Vol. 20 Supplement, Oct. 1999, pp. 451-456.
  22. Wei-Liang Liu, Hong-Ming Lin, Chiun-Yen Tung, Ming-Fong Tai, Y. D. Yao, **Yeukuang Hwu**, “Low Temperature Magnetic Properties of  $\text{Ag}_x(\text{Fe}, \text{Co}, \text{Ni})_{1-x}$  Solid Solution Nanoparticles”, *Engineering Chemistry & Metallurgy*, Vol. 20 Supplement, Oct. 1999, pp. 484-489. (NSC-88-2216-E-036-018)

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25. Hee-Joung Kim, Haijo Jung, Jin-O Hong, Ha-Kyu Jeong, Eun-Kyung Kim, Kyu-Ho Lee, Je-Kyung Seong, Jong Ho Je, In W. Kim, Yeukuang Hwu, Wen-Li Tsai, Hyung-Sik Yoo: "Micrometer resolution imaging using unmonochromatized synchrotron x rays: phantom, human breast tissue, and live animal imaging studies", *Proc. SPIE 4320, Medical Imaging 2001: Physics of Medical Imaging*, 409-416 (June 28, 2001); doi:10.1117/12.430898; <http://dx.doi.org/10.1117/12.430898>
26. Kim, C.C., Kim, J.K., Lee, J.-L., Yi, M.-S., Kim, J.-W., Noh, D.Y., **Hwu, Y.**, (...), Je, J.H.: "Structural evolution of Ni/Au contact on GaN(0001)", *Materials Research Society Symposium - Proceedings 639*, pp. G11.7.1-G11.7.6 (2001).(0)

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#### Book chapters:

1. Ivan M. Kempson, Yeukuang Hwu, Clive A. Prestidge: "Probing Protein Association with Nano- and Micro-Scale Structures with ToF-SIMS", *Proteins at Interfaces III State of the Art*, Chapter 33, pp 709–729, Chapter DOI: 10.1021/bk-2012-1120.ch033, ACS Symposium Series, Vol. 1120.
2. L.J. Brillson, R.E. Viturro, S. Chang, J.L. Shaw, C. Mailhot, R. Zanoni, **Y. Hwu**, G. Margaritondo, P. Kirchner, J. M. Woodall: "New electronic properties of metal/III-V compound semiconductor interfaces", in *Chemistry and defects in semiconductor heterostructures Symposium*, ed. M. Kawabe, T. D. Sands, E. R. Weber, R. S. Williams, (Mater. Res. Soc. Pittsburgh, PA, USA) p. 103-15
3. G. Margaritondo, **Y. Hwu**, and G. Tromba: "Synchrotron light: From Basics to coherence and coherence-related applications", in "Synchrotron Radiation: Fundamentals, Methodologies and Applications", eds. S. Mobilio and G. Vlaic (SIF Bologna, 2003), p. 25-53.
4. **Y. Hwu**, C. Y. Tung, et al, NATO IAS Proceedings
5. **Y. K. Hwu**, G. M. Chow, W.C. Goh, T.S. Cho, J.H. Je, D. Y. Noh, Hong-Ming Lin and C. K. Lin, "Phase Differentiation and Characterization of Nanostructured Composites by Synchrotron Radiation Techniques", *Nanostructured Films and Coatings*, Edited. by G. M. Chow etc., Kluwer Academic Publishers, Netherlands, 2000, pp. 203-214. (NSC-89-2216-E-036-023)
6. G. Margaritondo, **Y. Hwu**, J. H. Je and A. Grosso: "Refractive-index Microradiography in Materials Science", in *Progress in Condensed Matter Physics*, G. Mondio and L. Silipigni Eds. (Italian Physical Society, Bologna 2003), p. 353
7. Y. Hwu, J. H. Je, J. M. Yi and G. Margaritondo : Recent Contributions of Synchrotron

Radiation to nanoscience : Fabrication and Microscopy, in Highlights of Spectroscopies on Semiconductors and Nanostructures, G. Guizzetti, L. C. Andreani, F. Marabelli and M. Patrini eds. (Italian Physical Society, Bologna 2007), p. 375.

8. C. -C. Chien, C. -J. Liu, H. -S. Chen, C. -H. Wang, S. -T. Chen, W. -H. Leng, Y. Hwu: "Microradiology imaging of the biodistribution of polyethylene glycol (PEG) modified gold nanoparticles in cancer bearing mice" Proceedings of the Workshop on Synchrotron Radiation and Nanostructures: Papers in Honour of Paulo Perfetti. Ed. Antonio Cricenti and G. Margaritondo. (World Scientific Publishing, Singapore 2009) p. 132-147

## Non-refereed Publications:

### Conference Proceedings:

1. J. H. Je, S. K. Seol, Y. Hwu, W. L. Tsai and G. Margaritondo: "Real-time Microradiology Using Synchrotron S-rays", ISSRNS 2004: Synchrotron Radiation in Natural Science Vol. 3, No. 1-2, 26-27(2004) Polish Synchrotron Radiation Society
2. Meng-Hung Tsai, Hong-Ming Lin, Wen-Li Tsai, Yeukuang Hwu, "Examine the Gas Absorption Properties of Single Wall Carbon Nanotube Bundles by X-ray Absorption Techniques", Oral presented in International Conference on Nanomaterials and Nanotechnologies(NN 2003) , August 30 – September 6, 2003 , The Creta Maris Hotel, Hersonessos, Crete, Greece.
3. C. K. Lin, L. Du, S. P. Louh, P. Y. Lee, Hong-Ming Lin, Y. Hwu, "The Structure of Nanocrystalline Iron Sulfides Prepared by Mechanical Alloying", Proceeding of the Fifth International Conference on Nanostructured Materials, August 20-25, 2000, Sendai, Japan.
4. Hong-Ming Lin, Chiun-Yen Tung, Y. D. Yao, Yeukuang Hwu, Shah-Jye Tzeng, Wen-Li Tsai, and Pee-Yew Lee, "Structure and Magnetic Properties of  $Ag_xCo_{1-x}$  Nanoparticles", Proceeding of the Fourth International Conference on Nanostructured Materials, June 14-19, 1998, Stockholm, Sweden.
5. G. Margaritondo, F. Gozzo, D. Alfe, P. Almeras, H. Berger, M. Bertolo, M. T. Ciotti, C. Coluzza, T. dell'Orto, G. De stasio, S. Fontana, **Y. Hwu**, S. D. Lee, D. Mercanti, P. Perfetti, Y. I. Pieh and C. Y. Tung, Proc. 1995 ECASIA Conf., H. J. Mathieu, B. Reihl and D. Briggs Eds. (Wiley & Sons, New York 1996), p. 713.
6. F. Zanini, J. T. McKinley, **Y. Hwu**, D. Rioux, A. Terrasi, G. Margaritondo, U. Debska and J. K. Furdyna: "Heterojunction Band Lineup Control: Role of the Extended Dipoles", *Vuoto* **20**, 54 (1990).
7. A. Terrasi, G. Foti, **Y. Hwu** and G. Margaritondo: "Photoemission spectroscopy from graphitic clusters in amorphous carbon matrix", *Vuoto* **20**, 4 (1990).
8. P. Y. Lee, C. K. Lin, C. L. Cheng, and **Y. Hwu**, "Amorphization and Solid Solution Formation of Mechanically Alloyed  $Cu_{20}Ta_{80}$  Powders", presented and published at PFAM6, 24-26 Nov., 1997, Singapore.
9. 胡宇光、斯威克、葛費雪、林鴻明 "以同步輻射光電子能譜顯微術研究材料性質", 物理雙月刊 (十月號) 1998.
10. **Y. Hwu**, J. H. Je, D. Y. Noh and G. Margaritondo: "Phase-contrast X-ray Imaging", *Synchrotron Radiation Science and Technology (Bull. Korean Synchrotron Radiation Users'*

- Association) **6**, 16 (1999).
11. Y. Hwu, W. L. Tsai, H. H. Hsieh, J. H. Je, H. S. Kang and G. Margaritondo: “Collimation-enhanced Micro-radiography in Real Time”, Proc. Int. Conf. on Future Applications of Science with Synchrotron Radiation and Free Electron Lasers in Europe, G. Le Lay and B. Aufray Eds, (EDP, Les Ulis 2001), p. 239.
  12. G. Margaritondo, Y. Hwu and G. Tromba: “Synchrotron Light: from Basics to Coherence and Coherence-related Applications”, in *Synchrotron Radiation: Fundamentals, Methodologies and Applications*, S. Mobilio and G. Vlaic Eds. (Società Italiana di Fisica, Bologna 2003), p. 25.
  13. \*\*Stop recording it after 2003.

Thesis:

High-resolution photoemission study of the high-temperature superconductors

Y Hwu

Wisconsin Univ., Madison, WI (United States)

Invited talks:

### **Department Colloquium**

1. Department of Physics of Indiana University (1991).
2. Department at CEA (Commission of Atomic Energy), France (1997).
3. Department Colloquium at the Materials Science Department, Pohang University of Science and Technique, Korea (1997).
4. Department Colloquium at the Physics Department, Johannes Gutenberg University of Mainz, Germany (1997).
5. Department of Physics, Pohang University of Science and Technology, May 15, 2000.
6. Department of Materials Science, Pohang University of Science and Technology, May 17, 2000
7. Department of Physics, University of Catania, Italy, March 20, 2001.
8. Ecole Polytechnique de Lausanne, presentation for general publics in the event of Science for City, Lausanne, May 6, 2001.

\*\*Stop recording it after 2001.

### **Invited Talks at International Conferences:**

1. American Ceramic Society Annual Meeting (1992).
2. The International Symposium of X-ray Absorption Spectroscopy, Hsinchu, Taiwan. (1997).
3. KSRS-2000—Inauguration of Kutchatov Synchrotron Radiation Source, Kutchatov Institute, Moscow, March, 2000
4. Interface Controlled Materials: Research and Design, ICMRD-2000, St. Petersburg, Russia, June 7-9, 2000.
5. SRI-2000, 7<sup>th</sup> International Conference on Synchrotron Radiation Instrumentation, Berlin, Germany, Aug. 21-25, 2000: “Real Time Micro-Radiology with SR on Live Specimnes”
6. 3<sup>rd</sup> International SLS (Swiss Light Source) Workshop and User Meeting, Les Diablerets, Switzerland, Oct. 16-20, 2000.
7. Korean Research Institute of Radiological Science (RIRS) Anniversary Symposium, Yonsei University, Seoul Korea, Nov. 16-18, 2000: “New generation micro-radiography using high definition x-rays”.
8. International Symposium on the Science of Surfaces and Nanostructures, Singapore Nov. 22-24, 2000.
9. Swiss-Korean International Joint Korean-Swiss Workshop on Novel Coherence-based Radiology Techniques, Leukerbad, Switzerland, March. 2001.
10. International conference on materials for advanced technology (ICMAT-2001), Singapore, July 2-7, 2001.
11. The 1<sup>st</sup> International Workshop on Advanced Materials for Nanotechnology, Pohang, Korea, Nov. 23, 2001.
12. Workshop for C. N. Yang’s 80 birthday—Organized by Chinese Physics Society, Nov. 11, 2002 : ”Phase Contrast Microradiography-A New Way to Look at Matter with Deeper Insight”.
13. Optical Engineering Society Annual Meeting, National Taiwan University of Science and Technolgy. Dec. 12, 2003:” Phase Contrast Microradiography—Opportunities, Impacts and Challenges to the Micro- and Nano-Science”, Plenary Speaker.
14. The 23rd Symposium on Microscopy—The Annual meeting of ROC Microscopy Society, Jan. 18, 2003: “Phase Contrast Microradiography”, Plenary Speaker.
15. Chinese Physics Society annual meeting, Feb. 14, 2003: “Phase Contrast Microradiography—Examining Matters Deeper with Higher Precision”, Plenary Speaker.
16. 2nd Swiss-Korean International Joint Korean-Swiss Workshop on Novel Coherence-based Radiology Techniques, Jeju Do, Korea, Feb. 19. 2003.
17. Workshop on Surface Science: Structural and Electronic Properties of Nanodeposit, Porto Alegre, Brasil, March 20-22, 2003. “Applying Phase Contrast Microradiography to micro- and nano-fabrications”.
18. The Electrochemical Society 203<sup>rd</sup> Meeting, Le Palais de Congres, Paris, France, April 27-May 2, 2003: “Rea Time In Situ Observation of Metal Electro-deposition with High-Resolution Microradiology” Monday April 28, 2003 Section AG1-Interfacial Studies by Synchrotron Techniques.
19. International Conference on Nanomaterials and Nanotechnologies (NN2003), Crete, Greece, Aug. 30-Sep. 6, 2003: “Phase Contrast Microradiography—Examining Matters Deeper with Higher Precision”.

20. MINATEC 2003, Grenoble, France. Sep. 22-25, 2003.
21. First Swiss-Taiwanese Workshop on Nanoscience and Nanotechnology, Oct.12-15, 2003, Zermatt, Switzerland.
22. National Synchrotron Radiation Research Center Annual User Meeting, Oct. 29-30, 2003.
23. NSC-USAF Joint Meeting on Nanoscience and Nanotechnology, Feb. 19-21, 2004, Maoui, Hawaii, USA.
24. The 9th Symposium on Recent Advances in Biophysics Biophysics Society of Taiwan, May 26-28, 2004, Taipei, Taiwan.
25. International Workshop "From Solid State to BioPhysics II", June 26-July 2, Dubrovnik, Croatia,
26. Workshop for Professor Tien T. Tsong's Retirement, Aug. 17-20, 2004, Taipei, Taiwan.
27. European Materials Research Society E-MRS Fall Meeting 2004, Symposium D "Applications of Linear and Area Detectors for X-ray and Neutron Diffraction and Spectroscopy", Invited Oral Presentation: "Real-Time radiology in micro and nano-scale" Warsaw, Poland, Sep. 6-10, 2004.
28. ITRI-Institution-wide colloquium, Oct. 1, 2004
29. Swiss Light Source Annual User Meeting, Oct. 4-6, Villigen, Switzerland
30. National Synchrotron Radiation Research Center Annual User Meeting, Oct. 28, 2004.
31. 52th Orient Forum on Science and Technology, Dec. 17-20, 2004, Shanghai.
32. Chinese Physics Society Annual Meeting, Feb. 1-3, 2005, Kaoshung, Taiwan.
33. NSC-USAF Joint Meeting on Nanoscience and Nanotechnology, Feb. 16-19, 2005, Hawaii, USA.
34. 261<sup>st</sup> Xiang Shang Science Conference "Synchrotron Radiation and Nanoscience-Nanotech", "Phase Contrast Nanoradiology for Nanoscience, Nanotechnology and Medicine", September 13-15, 2005, Xiang Shang, Beijing, China.
35. International Symposium on the Methodological Study of Phase Contrast Hard X-Ray Imaging of Nanobiological and Medical Samples with Synchrotron Radiation, "Micro- and Nano-radiology", Beijing, June 5 – 9, 2006.
36. 4th U.S. Air Force-Taiwan Nanoscience Initiative Workshop, February 8-9, 2007 Houston.
37. Swiss Light Source TOMCAT beamline inauguration ceremony, Swiss Light Source, Villigen, Switzerland, June 7, 2006
38. APBP 2007, "Imaging Sub-Cellular Structures with Ultrahigh Resolution Radiology", July 9-11, 2007, Cairns, Australia
39. Hofei Synchrotron Radiation Annual User Meeting 2007, July 22-25, 2007, Dalian, China. Plenary Talk.
40. IEEE-Nanomed, Macau University, Aug. 6-9, 2007, Macau
41. APPC10, August 21-24, 2007, POSTECH, Pohang, Korea
42. Taiwanese-Switzerland 2007, Zermatt, Oct. 18-20, 2007
43. AOFSTR-2007, Hsinchu, Nov. 1-2, 2007
44. Taiwan-Canada joint workshop on Emerging photonics application on medicine
45. 7<sup>th</sup> International Symposium on New Materials wieht High Spin Polarization" New materials for spintronics, theory and experiment", Kurort Rathen, Germany, Aug. 11-15, 2008, "Imaging, synthesis and fabrication with synchrotron X-rays".
46. Workshop on X-ray Micro Imaging of Materials Devices and Organisms, "Biomedical Imaging with 30 nm Resolution", 22nd Oct., 2008, Dresden, Germany
47. "The Technology and the Application of Full Field X-ray Microscopy with 25 nm Resolution",

- 1st International Workshop on Imaging Techniques with Synchrotron Radiation, NSRL (Hefei, P.R. China), December 3-5, 2008.
48. "X-Ray Imaging and Nanomedicine", 2nd International Workshop on Imaging Techniques with Synchrotron Radiation, Sanya, China, Nov. 8-15, 2009,
  49. EPIOPTICS-11, Erice, Italy, July 18-26, 2010 "Synthesis, characterization and applications of nanoparticles by synchrotron"
  50. Plenary talk, 2010 National Synchrotron Radiation Laboratory (Hefei, China) User Meeting, Lanzhou, Aug. 2-5, 2010 "Full-Field Hard-x-ray Microscopy and biology applications."
  51. "X-Ray Microscopy and Microangiography" International Workshop on "Advanced Imaging Methods for Microangiogenesis" September 20-23, 2010, Bois Genoud, Lausanne, Switzerland
  52. Plenary talk: "X-Ray Microscopy and Microangiography" 2010年中國電子顯微學會議暨第八屆海峽兩岸電子顯微學學術研討會(8<sup>th</sup> Cross Strait Workshop on Electron Microscopy, HongZhou, China), 2010 Aug. 8-10, 中國杭州
  53. The International Workshop on *Imaging Techniques with Synchrotron Radiation* (ITSR2010), "Microangiogenesis and Nanomedicine", November 6-10, 2010, Suzhou, China.
  54. Cross Strait Workshop on Nanomaterials, "Microangiogenesis and Nanomedicine", Institute of Solid State Physics, Chinese Academy of Science, Hefei, Dec. 1, 2010.
  55. 第七屆海峽兩岸超微顆粒學術研討會，遼寧丹東，Aug. 7-10, 2011，邀請演講 "Controlled hydrogel photopolymerization inside live systems by X-ray irradiation"。
  56. Workshop on Neutron and X-ray Scattering for the Structures and Dynamics of Nanoscale Materials, "Microangiogenesis and Nanomedicine", December 9-10, 2011 Korean Advanced Institute of Science and Technology (KAIST), Korea
  57. AS-JST Joint Workshop on Innovative Use of Light and Nano/Bio Materials, Taipei, Taiwan May 26-27, 2011. Plenary talk: "One-Pot Tuning of Au Nucleation and Growth: Synthesis of sub-10 nm Au Nanoparticles for biomedical applications".
  58. NSRRC-SLS Bilateral Workshop, Swiss Light Source, Paul Scherrer Institute, September 12, 2011. "X-ray Imaging Reaches 15 nm Resolution for Microangiogenesis and Nanomedicine".
  59. 中國顆粒學會第八屆學術年會—暨海峽兩岸顆粒技術研討會，九月六日，2012，杭州 "Nanoparticles for X-ray imaging, labeling and therapy".
  60. 2012年中國電子顯微學年會，金牛賓館，四川成都，2012年11月23日。 "A synergetic and intersiciplinary approach to multimodality biomedical imaging".
  61. The 5th International Workshop on FEL Science -- Creation of New Sciences, Oct. 29, 2012, Gyeongju, Korea. "Nanofabrication for X-ray Imaging".
  62. "Morpho-Spectral Imaging in Biosciences (MSIB)" 2012 Workshop, Bordeaux, France. Nov. 5-6, 2012 "Nanotechnology for X-ray Imaging".
  63. 第十屆海峽兩岸電子顯微學學術研討會，麗江，2012年11月11-18日。 "Nanotechnology for X-ray imaging".
  64. 2012年材料年會「奈米材料應用論壇」，斗六，虎尾科技大學，2012年11月24日。 "Nanoparticles for X-ray imaging, labeling and therapy".
  65. 4th Taiwan-Japan Symposium on Nanomedicine, January 14, 2013, Institute of Physics, Academia Sinica. "Nanoparticles for X-ray imaging, labeling and therapy".
  66. Technologies for Medical Diagnosis and Therapy Symposium, Academia Sinica, Taiwan, Oct. 21. "Nano particles for X-ray Imaging and Therapy".
  67. 第十屆海峽兩岸納米科學與技術研討會，呼倫貝爾，Aug 9-11, 2013. "Nanoparticles for X-

ray Imaging and Therapy, X光與奈米醫學”

68. 2013年第八屆海峽兩岸超微顆粒學術研討會，吉首，中國湖南，2013年8月26日。 “Synthesis of Photoluminescent Gold nanoclusters by intense X-ray irradiation”.
69. 2nd WSIB Workshop, Hualien, Taiwan, 2013年10月31日。 “Nanoparticles for X-ray Imaging and Therapy”.
70. 6th International Workshop on FEL Science “New Horizon of XFEL”, Tainan, Taiwan, 2013 Nov. 4. “Nanotechnology for Synchrotron X-ray Imaging”.
71. The Hebrew University of Jerusalem and Academia Sinica Bilateral Workshop on Nanoscience and Nanotechnology, Academia Sinica, Nov. 15, 2013. “Biomedical NanoImaging Core Facility”.
72. The 8th Asian Meeting on Synchrotron Radiation Biomedical Imaging, Pohang, Korea, Nov. 21, 2013. “Nanotechnology for X-ray Imaging”.
73. 2013 PLS User Meeting, Pohang, Korea, Nov. 21, 2013. “New Nanoresolution X-ray Imaging in PLS-II”.
74. 中華民國化學學會2013年會，Nov. 23, 2013, 國立暨南大學, “Nanoparticles for X-ray Imaging and Therapy”.
75. Pan Pacific Symposium on Stem Cells and Cancer Research, Splendor Hotel, Taichung, April 13, 2014. “Phase contrast X-ray imaging and its prospect of medical applications”.
76. The 7th World Congress on Particle Technology (WCPT7), 北京，2014年5月21日。 “Nanoparticle synthesis and applications with X-rays”
77. The 12<sup>th</sup> Meeting of the Asian Pacific Society for Neurochemistry (APSN) 2014, August 26, 2014, Howard Plaza Hotel, Kaoshung, Taiwan. “X-ray Nanotechnology for biomedical Imaging”
78. International Union of Materials Research Societies – The IUMRS International Conference in Asia 2014 (IUMRS-ICA), August 24-30, 2014, Fukuoka University, Japan. “Nanoparticles for X-ray Imaging and therapy”.

\*\*\* Lost Records between 2014-2017

79. The 2017 E-MRS Spring Meeting, Strasbourg Convention Center, France, May 22-26, 2017, Invited Talk: “X-ray imaging of nanoparticles”. <https://www.european-mrs.com/meetings/archives/2017-spring-meeting>.
80. The 10<sup>th</sup> Cross Strait Nano Conference (海峽兩岸超微顆粒學術研討會), 雲南玉溪, China, Aug. 19-20, 2017, Plenary Talk: “X-ray synthesized gold nanoparticles as multimodality imaging agents”
81. 18<sup>th</sup> International Union of Materials Research Societies-International Conference in Asia (IUMRS-ICA), Nankang Convention Center, Nov. 6, 2017, Keynote Talk: “The Synthesis and Characterization of Nanoparticles with X-rays”. <http://www.conf.tw/site/page.aspx?sid=1153&lang=en>.
82. The 3rd East-Asia Microscopy Conference (EAMC3) November 7~10, 2017, Exhibition Center 2, BEXCO in Busan, South Korea, Invited Speaker: “Multi-scale multi-dimensional imaging for brain” <http://eamc3.org/index.php>.
83. The 13th International Conference on Synchrotron Radiation Instrumentation (SRI 2018), June 11-15, 2018. Taipei World Trade Center. Plenary Speech: “Synchrotron X-ray imaging for brains”. <http://sri2018.nsrcc.org.tw/site/page.aspx?pid=901&sid=1157&lang=en>.
84. The 14th Cross-Strait Workshop on Nano Science and Technology, University of Macau, June



- 21-24, 2018, Keynote speaker “Synchrotron X-ray imaging for brains”, <https://cswnst14.github.io/index.html>.
85. 中國顆粒學會第十屆學術年會 暨 海峽兩岸顆粒技術研討會, Aug. 9-12, 2018, 瀋陽, Plenary talk “Imaging Individual Drug-Carrying Liposome Particles in Solution by Free-Electron-Laser Coherent Diffraction”.  
<http://www.csp.org.cn/general/index.aspx?nodeid=15&page=ContentPage&contentid=38748>
86. The 9th Vacuum and Surface Science Conference of Asia and Australia (VASSCAA-9), Aug. 12-16, 2018, Sydney Masonic Center, Sydney, Australia. Invited Talk “AustraliaMicro- and nano-tomography with nanoparticles”.  
<https://archive.ansto.gov.au/Events/9thVacuumandSurfaceScienceConferenceofAsiaandAustralia/programme/index.htm>.
87. International Symposium on Grids & Clouds 2019 (ISGC 2019), Academia Sinica, Taipei, April. 4, 2019. Invited Talk: “X-ray imaging of brains”
88. 15<sup>th</sup> International Conference on Diffusion in Solids and Liquids (DSL 2019), June 24-28, Athens, Invited Talk: “Imaging Individual Drug-Carrying Liposome Particles in Solution by Free-Electron-Laser Coherent Diffraction” <https://www.dsl-conference.com>.
89. International Conference From the Nano World to StarDust (NW2SD), Palais du Pharo, Marseille, France, July 17-19, 2019, Invited Talk: “Brain Mapping with X-rays”.  
<https://nw2sd.sciencesconf.org/>.
90. The 12th Cross Strait Nano Conference (海峽兩岸超微顆粒學術研討會), 宜昌, China, Aug 12, 2019. Plenary Talk: “Biomedical Nanoparticle Synthesis by High-energy Photons”

Patents: 9 US patents, 4 ROC patents

1. Apparatus and method for imaging an object with real-time response

Inventors: Yeu-Kuang Hwu, Jung Ho Je, Giorgio Margaritondo

Publication date: 2003/2/25, Patent office: US, Patent number: 6526121, Application number: 09537628

Description

A new radiography method which utilizes contrast enhancement mechanisms with highly collimated X-ray beams without optics to achieve high imaging resolution and improve the time resolution is disclosed. This invention includes irradiating the object with an unmonochromatized beam, specifically highly collimated synchrotron radiation, and detecting an unmonochromatized beam image after the unmonochromatized beam has passed through the object. With compact design, a system for imaging an object with very high resolution, X-ray radiography with a wide range of X-ray sources, such as synchrotron radiation, without any sophisticated X-ray optics is also disclosed. This invention may achieve real-time images

with micrometer resolution.

## 2. Imaging of biological structures

Inventors: Yeu-Kuang Hwu, Giorgio Margaritondo, Jung Ho Je

Publication date: 2011/8/2, Patent office: US, Patent number: 7991454, Application number: 10435717

### Description

Images of blood vessels of a body are obtained by injecting a refraction enhancement contrast agent into the blood vessels to increase a difference in refractive indices of the blood vessels and surrounding material. The blood vessels are irradiated with a penetrating radiation, and an image of the blood vessels is generated based on detected radiation. The image has visible edge enhancement features indicating boundaries of the blood vessels.

## 3. Single monomer derived linear-like copolymer comprising polyethylenimine and poly (ethylene glycol) for nucleic acid delivery

Inventor: SY Lin, CS Yang, YK Hwu

Date: 2013/6/11, Patent office: US, Patent number: 8461224, Application number: 13041023

### Description

A method of synthesizing a random copolymer of polyethyleneimine and polyethylene glycol, comprising exposing ethanolamine in a solution to electromagnetic radiation for a sufficient time to polymerize the ethanolamine (OHCH<sub>2</sub>CH<sub>2</sub>NH<sub>2</sub>) and thereby resulting in formation of the random copolymer comprising polyethyleneimine and poly (ethylene glycol), wherein the polyethyleneimine comprises ethyleneimine (—CH<sub>2</sub>CH<sub>2</sub>NH—) unit and the polyethylene glycol comprises ethylene glycol (—CH<sub>2</sub>CH<sub>2</sub>O—) unit, and the polyethylenimine of the random copolymer has a substantially linear backbone. ...

## 4. Solid phase gold nanoparticle synthesis

Inventors

Chia-Hung Lee, Wei-Neng Liao, Shih-Hsun Cheng, Jen-Kun Chen, Chung-Shi Yang, LO Leu-Wei, Yeu-Kuang Hwu, LIN Fong-Sian

Date: 2014/5/27, Patent office: US, Patent number: 8734844, Application number: 13109438

#### Description

A method of synthesizing ligand-conjugated gold nanoparticles (AuNPs) is disclosed. The method comprises: a) providing an amine-modified silica particle; b) providing a solution comprising Au<sup>3+</sup> ions; c) suspending the amine-modified silica particle in the solution comprising Au<sup>3+</sup> ions; d) allowing the Au<sup>3+</sup> ions to be adsorbed and/or immobilized onto the surface of the amine-modified silica particle; e) exposing the Au<sup>3+</sup> ions immobilized onto the surface of the amine-modified silica particle to radiation to obtain bare gold nanoparticles (AuNPs) adsorbed and/or immobilized onto the surface of the amine-modified silica particle, wherein the bare AuNPs are without organic surface modifications; and f) reacting a ligand with the bare AuNPs adsorbed and/or immobilized onto the surface of the amine-modified SiNP and thereby obtain ligand-conjugated gold nanoparticles (AuNPs).

#### 5. Copolymer, complex and method for releasing viruses using pH-dependence of the copolymer

Inventors: Yeu Kuang Hwu, S Ja Tseng

Publication date: 2015/10/6, Patent office: US, Patent number: 9150688, Application number: 13459894

#### Description

A method for releasing viruses includes the steps of: preparing a first negatively charged complex, comprising a plurality of viruses, a plurality of polyethyleneimine particles, and a copolymer; transferring the complex to an acidic region, thereby transforming the complex into a positively charged complex to release a portion of the viruses in the acidic region; and transferring the complex to a non-acidic region, thereby transforming the positively charged complex into a negatively charged complex. One embodiment of the copolymer has the following chemical formula:

#### 6. Methods of treating cancers

Inventors: Yeu-Kuang Hwu, Tsung-Yeh Yang, Chi-Jen Liu, Chang-Hai Wang

Publication date: 2016/10/25, Patent office: US, Patent number: 9474769, Application number: 12028026

#### Description

A method of treating cancer. The method includes introducing an effective amount of an

oxidative catalyzing agent including titanium oxide, zinc oxide, zirconium oxide, tungsten oxide or tin oxide into a biological entity, and irradiating the biological entity with a ray. The oxidative catalyzing agent produces hydroxyl or hydrogen peroxide radicals after irradiation with the ray thereon.

#### 7. Method of tracking specific cells in vivo

Inventors: Yeu-Kuang Hwu, Chia-Chi Chien, Cheng-Liang Wang

Publication date: 2017/5/30, Patent office: US, Patent number: 9662080, Application number: 14016060

##### Description

A method of tracking specific cells in vivo is disclosed. The method of the disclosure includes: providing fluorescent nanoparticles suitable for targeting of specific cells; administering the fluorescent nanoparticles to a subject; providing an X-ray source to irradiate the subject; and determining the distribution and growth of the specific cells by the fluorescent images from the fluorescent nanoparticles and X-ray images of the subject irradiated by the X-ray source.

#### 8. Method, system, and light source for penetrating radiation imaging

Inventors: Yeu-Kuang Hwu, Tsung-Tse Li, Yu-Tai Ching

Publication date: 2015/8/13, Patent office: US, Patent number: 9799479, Application number: 14612393

##### Description

The present invention relates to a method, a system, and a light source for penetrating radiation imaging, and more particularly, to a method, a system, and a light source for X-ray imaging. The system for X-ray phase contrast and high resolution imaging of the present invention comprises an X-ray source comprising a plurality of X-ray micro-light sources, an X-ray sensor configured to receive X-rays penetrating an object, and a computer configured to receive and compute raw image data from the X-ray sensor so as to obtain a clear image of the object.

#### 9. Convection-free flow-type reactor and flow-type synthesis method

Inventors: Yeu-Kuang Hwu, Sheng-Feng Lai, Cheng-Liang Wang

Publication date: 2018/2/6, Patent office: US, Patent number: 9884306, Application number: 14324180

## Description

A convection-free flow-type reactor includes a reactor body. The reactor body includes a reaction chamber to house a fluid. An inlet is in communication with the reaction chamber to allow input of a reactant fluid. An outlet is in communication with the reaction chamber to allow output of a product fluid. An energy beam source device provides an energy beam to irradiate the reactant fluid in the reaction chamber. The disclosure further provides a convection-free flow-type synthesis method.

中華民國專利: 02A-1020514 「無對流效應之流動式反應器及流動式合成方法」

中華民國專利: I 498123 02A-1020306 「共聚物及複合物」

中華民國專利: I499428 02A-1020221 「肝素和金奈米粒子作為顯影劑之用途」

中華民國專利: I292321 Hwu, Yeu Kuang; Margaritondo, Giorgio; Je, Jung Ho: Imaging of Biological Structures, , 01/11/2008-02/11-2023

## Applied:

### Tumor vessel embolizing agent and method of embolizing tumor vessel

YK Hwu, CC Chien

US Patent App. 14/324,183

### Method of tracking growth and metastasis of specific cells in vivo

YK Hwu, CC Chien

US Patent App. 14/016,061

### Method for photopolymerizing hydrogel using x-ray irradiation

YK Hwu, SJ Tseng

US Patent App. 13/405,055

One-pot synthesis of linear-like polyethylenimine for intracellular imaging and nucleic acid delivery

SY Lin, LIN Fong-Sian, MK Chen, YC Jao, T Lin-Ren, HY Lin, CS Yang, ...

US Patent App. 12/868,939

Method for treating and/or diagnosing tumor by gold particles coated with a polymer

YK Hwu, CH Wang, CJ Liu, CL Wang, CH Chen, CS Yang, HM Lin, JH Je, ...

US Patent App. 12/545,824

Fabrication of freestanding micro hollow tubes by template-free localized electrochemical deposition

SK Seol, JH Je, YK Hwu

US Patent App. 12/504,774

Particles and manufacturing methods thereof

YK Hwu, CH Wang, CJ Liu, CL Wang, CH Chen, CS Yang, HM Lin, JH Je, ...

US Patent App. 12/545,822