# Albuquerque, NM | <u>kuo@lanl.gov</u> | 505-844-4261

## EXECUTE SUMMARY

A versatile materials science engineer with expertise in materials characterization and a wide range of transmission electron microscopy and spectroscopy techniques as applied to the understanding of synthesis-structure-property relationships. Highly collaborative with exposure to a variety of materials fields through research partnerships with university, national laboratory, and industry researchers around the world. Strong laboratory, communication, teaching, and mentoring skills. A Technical Microscopy Lab Manager well-versed at managing multiple applications and development in lab operation projects on time and within budget. A proven experienced leader with a strong track record of delivering improved and sustainable performance by utilizing analytical and problem-solving skills, as well as the ability to build and manage effective work teams. A multi-lingual (English & Mandarin) person.

## **Qualifications & Special Skills:**

- Technical Lab Operations and Managements
- Strategic Planning & Capital Procurements
- Facility Layout & Design
- Analytical Spectroscopy (EDS/WDS/EBSD/EELS)
- Leadership and communication skills

## PROFESSIONAL EXPERIENCE

- Vendors/Distributors/Agents Management
- Microscopy (HR-(S)TEM/SEM/FIB)
- Business Forecasting/Budgeting
- Design of Experiment (DOE)
- Define/implement characterization strategies

# Los Alamos National Lab, Center for Integrated Nanotechnologies, NM, USA

#### May 2022-Present

## Technologist Scientist/Electron Microscopy and Spectroscopy Technologist

- Manage the CINT Core Electron Microscopy Facility operation.
- Support the CINT User Program as well as CINT Scientists
- Develop the strategy and vision for CINT Core Electron Microscopy Facility.
- Collaborate with internal and external research institutions on electron microscopy and material characterization research projects.
- Makes recommendations on the advisability of service contracts for major common equipment and oversees and manages service contracts.
- Develop both In-Situ and Cryo Microscopy characterization techniques.

#### Materials Characterization Facility, Texas A&M Engineering Experiment Station, TX, USA

	Dec 2015 – May 2022
Research Scientist/Instruments Manager	Feb 2018 -
Lecturer, affiliated to MSEN Dept	Jan 2016-
Associate Research Scientist	Dec 2015 – Feb 2018
- Staff scientist and backup manager for the Texas A&M Univers	sity Materials Characterization Facility

- Staff scientist and backup manager for the Texas A&M University Materials Characterization Facility (MCF), a core analytical facility serving materials research characterization needs for over 400 users throughout the university.
- Demonstrates and practices general laboratory safety precautions. Defines and develops protocols according to laboratory needs.
- Maintained over \$20M of state-of-the-art analytical chemistry instrumentation at the MCF and trained over 1000 researchers to use: FIB, SEM, EDS, EBSD (S)TEM, FTIR spectrometer, differential scanning calorimeter (DSC), Nanoindenter and in-situ mechanical/thermo experiments.
- Develop the strategy and vision for electron microscopy facility at TAMU. (Project Leader)
- Collaborate with internal and external research institutions on electron microscopy and material characterization research projects.
- Oversee and manage the budget and expand the capabilities of the current facilities.

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- Makes recommendations on the advisability of service contracts for major common equipment and oversees and manages service contracts.
- Develop new EM applications for both LMIS and Plasma dual beam FIB systems.
- Provide support and analytical services to internal, external research groups and commercial clients.
- Conduct electron microscopy training courses, workshops and seminars. (Team Leader)
- Supervise and co-supervise both graduate students and post-docs on multidisciplinary research projects.

#### Achievements:

- Set up a series of theoretical/practical EM workshops training courses using innovation approaches, which covers SEM, TEM, EDS and EBSD for multidisciplinary background users (~2000 people) at Texas A&M University.
- Expand 155% on user database and raised 200% of revenue for MCF at Texas A&M within 2 years.
- Setup and conduct the first SEM course (MSEN614) which covers the fundamental knowledge of SEM, EDS and EBSD for multidisciplinary engineering background graduate students at Texas A&M University. Average Teaching Score: 4.81 /5.00.

## Wolfson Catalysis Centre, University of Oxford, Oxford, UK

## **Honorary Research Fellow**

#### Sep 2013 - Present

Sep 2012 - Dec 2015

- Develop the corresponding Electron Microscopy techniques for catalyst characterisation.
- Develop Quantitative analysis methodologies on the atomic and electronic structure of nanoscale materials.

## Achievements:

 Results from these collaborative studies were published in several scientific journals such as: Nature Communications (2014), Chemistry Communications (2015), Scientific Reports (2016) and Nature Chemistry (2017)

## Johnson Matthey Technology Centre, Sonning Common, Reading, UK

## **Senior Scientist**

- Build up TEM and STEM analysing methodologies and develop electron microscopy techniques customized for JM materials.
- Perform root cause determination of materials related failures.
- In charge direct HR-EM characterizations: (AC-TEM/STEM, EDX; Electron diffraction analysis).
- Develop and manage research projects with other industrial, academic and government institutions. (Team Leader)
- Evaluate processes and procedures to improve analytical efficiencies by Define/implement new characterization strategies. (Project Leader)
- Effectively manage multiple complex projects within specified timeline and under budget.
- Conduct electron microscopy related research projects in collaboration with researcher at JMTC and in academics, published research as a main author or a co-author. (Project Leader)

#### Achievements:

- Refine procedures for data acquisition and the analytical processing to maximize the efficiency.

## Oxford Instruments, NanoAnalysis, Singapore

# East Asia Application Scientist & Technical Sales Manager East Asia Application Scientist

**Sep 2010 – Jun 2012** Apr 2011 - Jun 2012

Sep 2010 - Apr 2011

- Support both direct sales teams and distributors by providing technical solutions and conducting training workshops on EDX, WDX and EBSD to end industries and academic consumers.

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- Vendors and distributors managements.
- Work with lead Scientists in the East Asia region (Singapore, Taiwan, Korea and Australia) to develop new projects and provide technical reports. (Team Leader)
- Lead and managed the research projects, wrote technical notes and brochures, involved in software testing and gave technical presentations at industries, academics and international conferences in East Asia and Australia regions. Provided consultancy and in EM related data interpretation to end customers. (Team Leader)
- Develop new markets and leverage business opportunities through industry corporations.

- Establish the development progress of OI products through the feedback from customers (VOC). <u>Achievements:</u>

 Initiate and organize Electron Microprobe Analysis workshops for both academia and industries in Singapore, Taiwan, Korea and Australia; increased the market share in the East Asia region by 30 % within 2 years.

# Electron Microscope Centre, University of Birmingham, UK

## **Teaching Assistant**

- Electron Microscope practical training courses for postgraduate students (TEM/SEM/EDX/WDX).
- Work on PhD graduate studies. See education section for details.

ProMOS Technologies Inc, HSIP DRAM Integration Tech. Dept., Hsinchu, Taiwan

#### **Process Engineer**

 In charge of MOL Process Engineering, Physical Failure Engineering, and Implant Process Development

#### Industrial Technology Research Institute, Hsinchu, Taiwan

#### Associate Researcher

- Instrumental development on sputtering PZT films with PVD technique and analyzing its residual stress by using X-ray diffraction (XRD), assisting in consultancy and preparing technical reports.

#### EDUCATION

Ph. D., Metallurgy and Materials	2005-2010
University of Birmingham	Birmingham, United Kingdom,
Concentration: Advanced Magnetic Materials Using Electron Microsco	оу
Advisors: Prof. Rex Harris, Prof. Ian Jones and Dr. Andy Williams	
M.S., Material Science	2001-2003
National Taiwan Ocean University	Keelung, Taiwan
Concentration: Thin Film Metallic Glasses	
Advisers: Prof. Jinn. P. Chu and Dr. Thaiyan Mahalingam	

## SPECIALIZED FIELDS

- Material Failure Analysis & Characterization
  Electron Microscopy & simulation (SEM/STEM)
- X-ray Microanalysis (EDX, WDX and EBSD)
- Processing of Magnetic materials
- Semiconductor Processing methodologies
- Materials processing and developmentNano materials Mechanical property test
- In-situ experiments

Sep 2005 - Aug 2010

Sep 2004 - Jul 2005

Sep 2003 - Aug 2004

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## **TECHNICAL SKILLS**

- Expert in HREM ((S)TEM / SEM), Cs-(S)TEM, Optical microscopy and Spectroscopy
- Expert in a range of TEM/SEM sample preparation (Dual Beam FIB with Manipulator)
- Expert in EPMA (EDX, WDX and EBSD) practical analyses
- Expert in X-ray diffraction (XRD) and atomic force microscopy (AFM) analyses
- Expert in advanced deposition (ADM-PVD), Semiconductor Processing methodology
- Expert in 2D, 3D Engineering Graphic (e.g., Corel Draw, Auto Cad, and Photoshop)
- Familiar with FTIR, DSC, TGA, DMA, ICP analysis techniques
- Familiar with programming language (e.g., MatLab, SketchUp, OriginLab, Delta Graph, Visual Basic 6.0, CASINO simulation, CaRIne Crystallography, Crystal Marker, Crystal Diffract and Single Crystal)

## **PROFESSIONAL CERTIFICATES**

09/2015	Gatan EELS & EFTEM Analysis Training School,
	Gatan UK, Warwick, UK
06/2013	Bruker Nano Analysis EDS User School,
	Bruker Nano Analytics Division, Berlin, Germany
08/2011	Wave Service, Installation & Application,
	Oxford Instruments NanoAnalysis, High Wycombe, UK
07/2011	Aztec EDS and EBSD Installation & Application,
	Oxford Instruments NanoAnalysis, High Wycombe, UK
02/2011	INCA x-stream and INCA mics hardware, Applications, INCA X-sight LN2,
	Oxford Instruments NanoAnalysis, High Wycombe, UK
11/2010	HKL Service and Installation,
	Oxford Instruments NanoAnalysis, High Wycombe, UK
07/2002	VLSI Training Course-Advanced Processing for VLSI Technology,
	National Nano Device Laboratories, Hsinchu, Taiwan

#### **PROFESSIONAL HONORS & AWARDS**

- 2013- Honorary Research Fellow (Elected), Wolfson Catalysis Centre, University of Oxford, Oxford, UK
- 2012- **Member (Elected)**, Institute of Physics
- 2016- **Fellow (Elected)**, Royal Microscopical Society (RMS); member since 2012

#### **PROFESSIONAL MEMBERSHIPS & AFFILIATIONS**

- 2016- Member, Microscopy Society of America (MSA)
- 2016- **Fellow**, Royal Microscopical Society (RMS); member since 2012
- 2012- Member (Elected), Institute of Physics (IoP)
- 2005- Committee Member, Midlands Microanalysis Users Group, UK

#### LEADERSHIP AND TEAMWORK

**President of Taiwanese Society,** University of Birmingham, U.K., 2006-2007 **Corporal**, Army of Republic of China, Taiwan, 2003-2004

**Student Coordinator**, The 2<sup>nd</sup> International Bulk Metallic Glasses Conference, Keelung, Taiwan, 2002 **President of Student Association**, Department of Mechanical Engineering at Da-Yeh University, 1998-1999

#### UNITED STATE PATENT

U.S. Patent Pending 10/898,240 Annealing-induced extensive solid-state amorphization in metallic films (2008)

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#### Winson's Publications List

#### PUBLICAIONS

- Sz-Chian Liou, Vladimir P. Oleshko, W. Chun-Hsin Kuo, Tan-Ju Yang and Guo-Jiun Shu "Investigation of the excitations of plasmons and surface exciton polaritons in monoclinic gadolinium sesquioxide by electron energy-loss spectroscopy and plasmon spectroscopic imaging" RSC Adv., 2022, 12, 10345–10354 (2022)
- Jiaying Mo, Eduardo C. M. Barbosa, Simson Wu, Yiyang Li, Yuancheng Sun, Weikai Xiang, Tong Li, Shengda Pu, Alex Robertson, Tai-sing Wu, Yun-liang Soo, Tiago V. Alves, Pedro H. C. Camargo, Winson Kuo, and Shik Chi Edman Tsang "Atomic-Precision Tailoring of Au-Ag Core-shell Composite Nanoparticles for Direct Electrochemical-Plasmonic Hydrogen Evolution in Water Splitting" Adv. Funct. Mater., 2102517 (2021)
- Qiang Li, Cheng Hu, Mengjie Li, Phuc Truong, Jinghao Li, Hao-Sheng Lin, Mandar Naik, Sisi Xiang, Brian Jackson, Winson Chun-Hsin Kuo, Wenhao Wu, Yunqiao Pu, Arthur Ragauskas, Joshua S Yuan "Enhancing Multifunctional Properties of Renewable Lignin Carbon Fiber via Defining Structure-Property Relationship Using Different Biomass Feedstock" Green Chemistry (2021)
- Yubing Zhou, Sz-Chian Liou, Meng-Ting Lee, Christopher Klingshirn, Xiaoxiao Ge, Winson Kuo, and Guo-Jiun Shu. "Investigation the topological defects induced anisotropic π plasmon in Tin-doped Lead Selenide (Pb1-xSnxSe) by Momentum Resolved Electron Energy Loss Spectroscopy". Appl. Phys. Lett. 116, 182108 (2020)
- Mengying Liu,\* Matteo Seita, Ta Duong, Winson C. H. Kuo, and Michael J. Demkowicz "Preferential corrosion of coherent twin boundaries in pure nickel under cathodic charging" PHYSICAL REVIEW MATERIALS 3, 063606 (2019)
- Guo-Jiun Shu, Yubing Zhou, Meng-Yu Kao, Christopher J. Klingshirn, Michael R. S. Huang, Yi-Lin Huang, Yujia Liang, W. C. H. Kuo, and Sz-Chian Liou "Investigation of the π plasmon and plasmonexciton coupling in titanium diselenide (TiSe2) by momentum-resolved electron energy loss spectroscopy" Appl. Phys. Lett. 114, 202103 (2019)
- Sichuang Xue; Winson C. H. Kuo; Qiang Li; Jie Ding; Ruizhe Su; Haiyan Wang, **"Texture-directed twin** formation propensity in Al with high stackingfault energy", Acta Materialia 2018
- Yuan Yue, Daniel Juarez-Robles, Yan Chen, Lian Ma, Winson C. H. Kuo, Partha Mukherjee, Hong Liang "Hierarchical Structured Cu/Ni/TiO2 Nanocomposites as Electrodes for Lithium-Ion Batteries" ACS Appl. Mater. Interfaces, 9 (34), pp 28695–28703, 2017,
- Guoliang Liu, Alex W. Robertson, Molly Meng-Jung Li, Winson C. H. Kuo, Matthew T. Darby, Mohamad Muhieddine, Yung-Chang Lin, Kazu Suenaga, Michail Stamatakis, Jamie H. Warner, Shik Chi Edman Tsang, "Single Co atom doped MoS<sub>2</sub> monolayer catalyst for hydro-deoxygenation reaction" Nature Chemistry, 2017
- Yao Zhao, Niancai Peng, Xueyong Yao Zhao, Niancai Peng, Xueyong Wei, Zhuangde Jiang, Winson Chun Hsin Kuo, "Synthesis of ZnS Urchin-like Nanostructures for Electrochemical Determination of Uric Acid", IEEE Sensor, Oct. 2016, FL, USA
- Molly Meng-Jung Li, Jianwei Zheng, Jin Qu, Fenglin Liao, Elizabeth Raine, Winson C. H. Kuo, Shei Sia Su, Pang Po, Youzhu Yuan & Shik Chi Edman Tsang "The remarkable activity and stability of a highly dispersive beta-brass Cu-Zn catalyst for the production of ethylene glycol" Scientific Reports, 2016
- Chun Wong, Aaron Chan, Abdul Hanif Mahadi, Molly Meng-Jung Li, Elena Cristina Corbos, Chiu Tang, Glenn Jones, Winson C. H. Kuo, James Cookson, Peter Trenton Bishop and Shik Chi Edman Tsang, "Interstitial Modification of Palladium Nanoparticles with Boron Atoms as a New Alternative Green Catalyst for Ultra-selective Hydrogenation Reactions" Nature Comm, 2015
- Simon Jones, Simon M. Fairclough, Maxwell Gordon-Brown, Weiran Zheng, Amy Kolpin, Bo Pang, Winson C. H. Kuo, Jason M. Smith and Shik Chi Edman Tsang, **"Dual Doping Effects (Site Blockage and Electronic Promotion) Imposed by Adatoms on Pd Nanocrystals for Catalytic Hydrogen Production"**, ChemComm, 2014

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- S. S. Su, I.T.H. Chang, W. C. H. Kuo, D. Price, Z. Pikramenou and J. Lead, "Pulsed Electrical Discharge Synthesis of Red Photoluminescence Zinc Oxide Nanoparticles", Journal of Nanoparticles Research, 2014
- Winson C. H. Kuo, Martha Briceno and Dogan Ozkaya, "Characterisation of Catalysts Using Secondary and Backscattered Electron In-lens Detectors", *Platinum Metals Rev.*, 58, (2), 106–110, 2014
- S. S. Su, I. T. H. Chang, W. C. H. Kuo, "Effects of processing conditions on the sintering response of hypereutectic Al–Si–Cu–Mg P/M alloys", Materials Chemistry and Physics, Vol. 139 (2-3), pp 775-782, 2013
- N. Rowlands, S. Bhadarc and C. H. Kuo, "A Large Area Silicon Drift Detector for use in Analytical Transmission Electron Microscopy", Proceedings of the 28<sup>th</sup> MST Annual Conference, Chiang Rai, Thailand, 5-7 January 2011
- J. P. Chu, C. T. Liu, T. Mahalingam, S. F. Wang, M. J. O'Keefe, B. Johnson, and C. H. Kuo **"Annealing-induced full amorphization in a multicomponent metallic film"**, PHYSICAL REVIEW B 69, 113410, 2004
- C. Y. Kevin Shieh, S. W. Chu, and C.H. Kuo, **"The Improvement of Low-Reynolds Number Turbulence Model in Compressible"**, Proceedings of the Seventh National Conference on Computational Fluid Dynamics, Pingtung, Taiwan, 2000

## PUBLICATIONS IN SUBMISSION AND PREPARATION

- Shei Sia Su, Winson C. H. Kuo, Homero Castaneda "Comparison of Atmospheric Corrosion and Laboratory Testing of Zn and Zn Alloyed Coated Steel"
- Shei Sia Su, Cengiz Yegin, Winson Chun-Hsin Kuo, Mustafa Akbulut, Homero Castaneda "Corrosion behavior of Boron Nitride Nanosheet reinforced Copper Matrix Composite Coatings"
- S. S. Su, I.T.H. Chang, C. H. Kuo, "Effect of Cu and Ni additions on Al-Si-Mg Alloys"
- S. Adrwish, C. H. Kuo, M. Zakotnik, I.R. Harris and A.J. Williams, "The effect of adding heavy rare earth hydride on magnetic properties of NdFeB –type sintered magnets using appropriate heat treatment"
- C. H. Kuo, I. P. Jones, I. R. Harris and A. J. Williams, "The microstructure and magnetic properties improvement of Zr/ZrB<sub>2</sub> in Nd<sub>2</sub>Fe<sub>14</sub>B"

## PRESENTATIONS (\*: Invited )

#### **Plenary Presentations**

- \*Winson C. H. Kuo **"Electron Microscopy Characterisation: Eyes for Small Details"**, Material Science and Engineering, Texas A&M University, College Station, TX, 10<sup>th</sup> November 2014
- \*C. H. Kuo, "Characterisation Of Catalysts Using Secondary And Backscattered Electron In-lens Detectors", MIDSEM User's Meeting, Metallurgy and Materials, University of Birmingham, UK, 26<sup>th</sup> Jun 2013
- \*C. H. Kuo, "The limitation of Electron probe Micro Analysis", Workshop on FIB and EDS at National Taiwan University of Science and Technology, Taiwan, 7<sup>th</sup> March 2012
- \*C. H. Kuo, "Electron Probe Micro Analysis- from Crust to Core", Cross Straight Microscopy Workshop, National Cheng Kung University, 19<sup>th</sup>-25<sup>th</sup> Nov 2011, Taiwan
- \*H. S. Ubhi, D. Tatham, H. Jiang, C. H. Kuo, "In-situ EBSD Heating Study of a Folded Stainless Steel", IUMAS-V/ALC, Sung Kyun Kwan University, 23<sup>rd</sup> -27<sup>th</sup> May 2011, Seoul, Korea
- \*C. H. Kuo, "A Large Area Silicon Drift Detector for use in Analytical Transmission Electron Microscopy", Proceedings of the 28<sup>th</sup> MST Annual Conference, 5-7 January 2011, Chiang Rai, Thailand

## Workshop Talks

- \*Winson C. H. Kuo, "An introduction to Transmission Electron Microscope (TEM) and Titan", MCF Workshop, Material Characterisation Facility, Texas A&M University, USA, 22<sup>nd</sup> March 2021
- \*Winson C. H. Kuo, "An Introduction to SEM-EBSD and its applications", MCF Workshop, Material Characterisation Facility, Texas A&M University, USA, 15<sup>th</sup> March 2021
- \*Winson C. H. Kuo, "An introduction to TEM and CS-(S)TEM", MCF Workshop, Material Characterisation Facility, Texas A&M University, USA, 7<sup>th</sup> April 2019

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- \*Winson C. H. Kuo, "An introduction to latest EBSD and its applications", MCF Workshop, Material Characterisation Facility, Texas A&M University, USA, 7<sup>th</sup> March 2019
- \*Winson C. H. Kuo, "An Introduction to EDX and its applications", MCF Workshop, Material Characterisation Facility, Texas A&M University, USA, 4<sup>th</sup> March 2021
- \*Winson C. H. Kuo, **"Compositional Imaging Analysis in the SEM"**, MCF Workshop, Material Characterisation Facility, Texas A&M University, USA, 11<sup>th</sup> April 2017
- \*Winson C. H. Kuo, **"An Introduction to LMIS FIB and its Applications"**, MCF Open House Workshop, Material Characterisation Facility, Texas A&M University, USA, 16<sup>th</sup> Oct 2016
- \*Winson C. H. Kuo, "An introduction to SEM-EDX and its applications", SEM-EDX Workshop, Material Characterisation Facility, Texas A&M University, USA, 17<sup>th</sup> May 2016
- \*Winson C. H. Kuo, "An introduction to EBSD and its applications", EBSD Workshop, Material Characterisation Facility, Texas A&M University, USA, 8<sup>th</sup> April 2016
- \*C. H. Kuo, **"Electron Probe Micro Analysis in Electron Microscopy"**, Zeiss Singapore Opening Workshop at Nanyang Technological University, Singapore, 11<sup>th</sup> January 2012
- \*C. H. Kuo, "An Introduction to EDS and EBSD", Electron Microscopy Workshop at National Tsing Hua University, Hsinchu, Taiwan, 8-9<sup>th</sup> December 2011
- \*C. H. Kuo, "An Introduction to both EDS and EBSD", Workshop on Electron Microscopy for Material Science Research, University of Putra Malaysia, 14<sup>th</sup>-17<sup>th</sup> June 2011, Malaysia
- \*C. H. Kuo, "Electron Back-Scatter Diffraction in the Scanning Electron Microscope-An introduction into the method and its applications", EDS/EBSD Workshop at Sung Kyun Kwan University, 30<sup>th</sup> -31<sup>st</sup> May 2011, Seoul, Korea
- \*C. H. Kuo, "Spotlight on the Advantage of HKL EBSD system", EBSD Workshop in Sung Kyun Kwan University, 25<sup>th</sup>-26<sup>th</sup> January 2011, Seoul, Korea
- \*C.H. Kuo **"The Principal and Applications of EBSD Technology"**, Workshop training course at National Cheng Kung University, Taiwan, 9/12/2010
- \*C.H. Kuo "The Applications of EDX and EBSD", Workshop training course at Nanyang Technological University, Singapore, 16/11/2010