
DR. CADMUS YUAN

Personalalia

Full Name: Cadmus Chang-Ann Yuan
Born: 23-Feb-1976 Kaohsiung, Taiwan, R.O.C.
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Personality and Ambition:

Personality:

- Creative :
I initialize new and creative ideas for scientific innovation for academic impact.
- Result Driven :
I focus on multidisciplinary scientific challenges to create maximum academic and societal value.
- Committed :
For complicate project organization works or crash actions, I take proper actions to deliver high quality results.
- Strong International Network :
I have strong network in research organization and leading companies, and initiate workshops and collaborated projects.
- T-type Person :
I have a strong background on microelectronics, optoelectronics and bio-physics, also covers various technical and non-technical domains.

Ambition: Leadership for scientific impact to the society

Biography

Dr. Cadmus Chang-Ann Yuan obtained his PhD from power mechanical department (PME), National Tsing Hua University at 2005. He is the chief scientist in Ichijouriki LS R&D Co., Ltd, and responsible for new technology platform development. He was currently full research fellow of institute of semiconductors, Chinese academy of science, China, via CAS President's International Fellowship Initiative (PIFI) (also known as 100-people plan).

He was program director in State Key Laboratory for SSL, leading the group of advanced packaging and system integration (APSI), which focused on the packaging/lamp/luminaire reliability, new packaging concept and multi-function integration. By 2013, his colleagues and he released SSL product level luminous depreciation accelerated testing method, including theory and standard (CSA020). From 2012 to 2015, he and his team are obtained more than 30 invention IPs and 72M rmb budget to his department, including 3 863 projects, international collaboration projects and local government/company fund.

After his PhD graduation, Dr. Yuan stayed in Europe for 8 years, with the working experience covering from university, international enterprise and research institute. He was in TNO (The Netherlands Organisation for Applied Scientific Research) working as strategy developer and project leader of solid state lighting (SSL) and microelectronics. Together with Philips Lighting, the largest international collaborated project via Eniac/JTI platform, Enlight (total budget of 43M Euro for 3 years), was granted by European Commission. He was a senior concept development project leader in NXP Semiconductors, Netherlands. He led several new concept development projects to initiate, validate and industrialize new electronic packaging concepts, covering QFN, WLCSP and MEMS packaging.

He was a postdoc fellow of department of precision and microsystems engineering (PME), TUDelft (Delft University of Technology), Netherlands. He established the molecular level material property modeling platform by molecular dynamics simulation. Moreover, He initialized and involved 2 FP7 European (international) granted projects and two STW (Dutch Technology Foundation) projects. He taught the course "Advanced Packaging" in TUD for 4 years, as part-time researcher fellow.

During his PhD program, he extended the continuum mechanics to nanometer level and he successfully modeled dsDNA molecule to predict its rotating/twisting/unzipping behavior. In his research work in TUDelft, the

molecular dynamics (MD) method has been applied to interfacial delamination prediction of the low-k amorphous/porous material and sensitivity/selectivity modeling of the molecular gas sensors. In LED domain, the equivalent theory is applied to the ray tracing modeling method for multi-luminescence materials.

My research interests are optoelectronics and advanced electronics (especially, heterogeneous integration of bio-electronics). I would like to start my research from optoelectronic domain, and moving to heterogeneous integration of bio-electronics with fully understanding of the molecular characteristics and environment conditions.

Education

- 1995.10 – 2000.6 Bachelor in Civil Engr., National Chiao Tung Univerisy, Taiwan.
- 2000.10 – 2005.6 Ph.D. in Mechanical Engr., National Tsing Hua University, Taiwan.

Working experience

- 2015.6~ Ichijouriki LS R&D Co., Ltd., Taiwan
www.ichijouriki.com
Chief Scientist of Technology Platform Development:
 - LES Light source Technology
 - SSL reliability
 - Psychological Lighting Design
- 2012.07 – 2015.4 SKL-SSL, Beijing/Changzhou(Jiangsu)
www.skssl.org
Program Director of Advanced Packaging and System Integration
 - **Leading CSP development since 2013 with JP partners.**
 - Team (>30 engineers) and competence building
 - Reliability testing Standard development and promotion: 1 CN national standard.
 - Leading 2 x 863 program (China national R&D) proposal and granted by MOST.
 - 50 IPs filed in 3 years (incl. invention and new type IPs)
- 2012.07 – 2015.4 Institute of Semiconductors, CAS, Beijing
www.semi.cas.cn
Full Research Fellow (CAS President's International Fellowship Initiative (PIFI) in 2012)
 - Leading 1x 863 program (China national R&D) proposal and granted by MOST.
 - Leading Sino-German cooperation with Fraunhofer Institute IZM (Reliability and microintegration, Berlin) and IOF (Applied optics and precision engineering, Jena), Germany.
- 2010.04 – 2012.6 TNO, Eindhoven
www.tno.nl
Senior Scientist & SSL R&D program manager
 - New SSL technology development (SSL wafer level integration)
 - European international cooperated project proposal and 1 largest SSL Eniac/JTI platform project granted—Enlight.
 - Develop SSL system reliability prediction algorithm by statistic/physics approach. (Together with TUDelft)
- 2007.10 – 2010.04 NXP Semiconductors, Nijmegen
www.nxp.com
Senior Engineer Concept Development
 - Former Philips Semiconductors.
 - Working in headquarter of IC backend, key projects:

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- Cost reduction of IC packaging platform
 - New generation IC packaging concept development
 - RF power product thermal-mechanical modeling
- 2006.1 – 2007.9 Delft University of Technology, Delft
www.tudelft.nl
Post doctoral fellow
 - Molecular dynamic modeling platform development
 - Acquired 2 Dutch (national) projects and 2 international FP7 project.
 - Teaching course on Advanced packaging and Mechanics of Microelectronics (English)
 - 2005.7 – 2005.11 National Tsing Hua University, HsinChu, Taiwan,
Post doctor fellow, Assistant Director
 - 2002.7 – 2005.11 Advanced technology Corp., HsinChu, Taiwan
Engineer, Project Leader
 - 2001.7 Livermore Software Technology Company, CA, USA
www.lstc.com
Researcher

International Leadership

- Technical committee of IEEE conference ESTC
- Section chair of IEEE conference EuroSimE.
- Reviewer for IEEE transaction for CPT; Int. J of Microelectronics Reliability.
- WP leader of international collaboration Eniac/JTI proposal: Enlight, Parsimo .
- Co-supervisor for 2 PhD students: Dr. C.N Han: dsDNA molecular mechanics (NTHU,Taiwan), XP Chen: bio/chemical sensor modeling (TUD, NL); Supervisor for 5 MSc students.
- Lecturer TUD course ‘Mechanics of Microelectronics’ since 2006.
Lecturer TUD course ‘Advanced Microelectronic Packaging Technologies’ since 2006.

Competence Network Developer

- Actively contributing/leading to JTI/Eniac, Point-One, FP7 programs.
- Managed Georgia Institute of Technology (USA) alliance on interface fracture research with TUDelft.
- Strong network in Great China (China, HK, Taiwan), Europe (Netherlands, Germany, England, France, Italy, Russia, etc), and USA in university/institute and Lighting/semiconductor related companies.

Scientific Results

- Conference Papers (59), example:
 - Cadmus Yuan, Oswaldo Morales, Sau Koh, Sander Gielen, Wim Courage, Francis Evertz, Willem van Driel, G.Q. Zhang, “Graphical methods for SSL system reliability, ” Proceeding of China SSL conference, 2011.
 - C. Yuan, J. Wei, H. Ye, S. Koh, S. Harianto, M. Van den Nieuwenhof, et al., "Polymer-based 2D/3D wafer level heterogeneous integration for SSL module," in Proc. 13th International Thermal, Mechanical and Multi-Physics Simulation and Experiments in Microelectronics and Microsystems (EuroSime), Cascais, Portugal, 2012.
 - B. Sun, X. Fan, L. Zhao, C. Yuan, S. W. Koh, and G. Zhang, "A lifetime prediction method for Solid State Lighting power converters based on SPICE models and finite element thermal simulations," in Proc. 15th international conference on Thermal, mechanical and multi-physics simulation and experiments in microelectronics and microsystems (EuroSime), Ghent, Belgium, 2014, pp. 1-4.
- Journal Papers (35), example:
 - C. A. Yuan, O. van der Sluis, G. Q. Zhang, L. J. Ernst, W. D. van Driel, A. E. Flower & R. B. R van Silfhout. Molecular Simulation Strategy for the Amorphous/Porous Low-dielectric Constant Materials Applied Physical Letters, 2008, 92, 061909

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- C. Yuan; O. van der Sluis; W. D. van Driel & Zhang, G. Q. The need for multi-scale approaches in Cu/low-k reliability issues *Microelectronics Reliability*, 2008, 48, 833-842
 - KN Chiang, CA Yuan, CN Han, CY Chou, Y Cui, Mechanical characteristic of ssDNA / dsDNA molecule under external loading, *Applied Physical Letters*, 2006, 88, 023902
 - Book chapters (**total 7**), example:
 - C. A. Yuan, C. N. Han, H. M. Liu, and W. D. van Driel, "Solid-State Lighting Technology in a Nutshell," in *Solid State Lighting Reliability*. vol. 1, W. D. van Driel and X. J. Fan, Eds., ed: Springer New York, 2013, pp. 13-41.
 - Patents (**35**, excluding new type patent), example:
 - Y. Y. Hsu, K. N. Chiang, C. A. Yuan, C. C. Lee, and H. C. Cheng, "Three-dimensional multichip stack electronic package structure," US Patent, 2007.

Awards

- Nominated as Marquis Who's who in the world, and Top 100 engineers at 2009.
- Nominated as International Engineer of the Year at 2010.
- Nominated as Outstanding Intellectuals of the 21st century, 2009/2010.
- The SSL accelerated lifetime test standard received "Global SSL Events of the Year 2012-2013", from ISA.

Technical Expertise

- Multidisciplinary: Optoelectronics, Illumination Engr., Mechanics, Semiconductors, Bio-chemistry.
- Numerical modeling: mastering in many professional commercial tools (finite element method, molecule dynamics, ray tracing, etc) and self-coding (C++, VBA, etc)
- Reliability theory and accelerating testing method development
- Molecular level gas/chemical sensor design and sensitivity/selectivity prediction and optimization

Research Interest

- Optoelectronics: LED and SSL
 - Chip/Packaging interaction on optical, thermal and reliability aspects.
 - Energy-saving SSL system and smart control
 - SSL system reliability and testing methods
- Heterogeneous integration of bio-electronics
 - Bottom-up modeling approach of macromolecule: handshaking between molecule dynamic and continuum mechanics
 - Top-down modeling approach at cell level: flow-solid coupling algorithm with equivalent theory
 - Bio-molecule detection/sensing mechanism design and bio-chip integration

Teaching

- Bachelor course: Linear algebra, Modern Physics, Differential equations and complex variables, Numerical Analysis, Fundamentals of bio-chemistry
- Graduate school course: Advanced electronic packaging, LED light source technology, SSL lamp/luminaire and energy-saving smart system, Reliability engineering for electronic system, Optimization theory