

AEROTECH VI CONFERENCE 2016

Keynote Speaker : Prof. Chin-Hsiang Cheng

Stirling Engines Applied in Aerospace and Energy Systems: Premises and Promises

INTRODUCTION

Professional Position:

Distinguished Professor
Department of Aeronautics and Astronautics, NCKU
International Bachelor Degree Program on Energy, NCKU

Education:

PhD, Department of Mechanical Engineering, Tatung University,
Taipei, Taiwan

RECENT PUBLICATIONS (2011 – 2016)

Huang, Y.X., Jang, J.Y., Cheng, C.H., "Fractal Channel Design in a Micro Methanol Steam Reformer," *International Journal of Hydrogen Energy*, Vol. 39, pp.1998-2007, February 2014.

Chen, K.I., Cheng, S.C., Cheng, C.H., Wu, S., Jiang, Y.L. and Cheng, T.C., "The Effects of Gallium Addition on Microstructures and Thermal and Mechanical Properties of Sn-9Zn Solder Alloys" *Advances in Materials Science and Engineering*, Volume 2014 (2014), Article ID 606814, 10 pages, January 2014.

Chen, T.H., Cheng, T.C., Lin, W.S., Cheng, C.H., "The field emission properties of multi-wall nanotubes on flexible carbon cloth substrate with different interlayers." *Current Nanoscience*, Vol.10, pp. 497-503, 2014.

Panin, V.E., Moiseenko, D.D., Panin, S.V., Maksimov, P.V., Goryacheva, I.G., Cheng, C.H., "Mechanisms of elastic energy dissipation in the transition layer between a coating and a substrate under contact interaction," *Journal of Applied Mechanics and Technical Physics*, Vol. 55, pp. 318-326, March 2014.

Chuang, W.C., Lin, D.T.W., Hu, Y.C., Lee, H.L., Cheng, C.H., Chang, P.Z. and Quyen, N. B., "A Method Integrating Optimal Algorithm and FEM on CMOS Residual Stress," *Journal of Mechanics*, Vol. 30, pp.123-128, April 2014.

Cheng, C.H., Huang, Y.X., King, S.C., Lee, C.I., Leu, C.H., "CFD-based Optimal Design of a Micro-Reformer by Integrating Computational a Fluid Dynamics Code using a Simplified Conjugate-Gradient Method," *Energy*, Vol.70, pp:355-365, June 2014.

Hsieh, J.C., Lin, D.T.W., Cheng, C.H., Kingkaew, S., and Chen, S.C., "The optimal design of the thermal spreading on the high power LEDs," *Microelectronics Journal*, Vol. 45, pp:904-909, July 2014.

Chen, K.I., Cheng, S.C., Cheng, C.H., Wu, S., Jiang, Y.L. and Cheng, T.C., "Effects of a Ga Addition on the Wetting and the Tensile Properties of Sn-Zn-Ag Solder Alloys," to appear, *Indian Journal of Engineering & Materials Sciences*, Vol.21, pp. 621-627, Dec. 2014.

Cheng, C.H. and Chen, Y.F. "Topology Optimization of Conduction Path in Laminated Metals Composite Materials," *International Journal of Thermal Sciences*, Vol. 96, pp. 183-190, October 15, 2015.

Cheng, C.H., Chang, T.W., Huang, Y.X., Lee, C.I. and Shiu, H.R., "Effects of Variable Pore Sizes and Contact Angles on Liquid Water Transport in Gas Diffusion Layers of Fuel Cells," *International Journal of Energy and Technology*, Vol.7, Issue 1, pp. 101-110, August 2015. (Non-SCI)

Cheng, C.H., Nguyen, M.T., Leu, T.S., Chang, I.L., Liao, M.L., Panin, S.V., and Panin, A.V., "Magnetic and Mechanical Properties of Deformed Iron Nitride γ' -Fe₄N," *Journal of Applied Mathematics*, Vol. 2015, Article ID 238730, 9 pages, Sep. 2015. (Non-SCI)

Yang, H.S. and Cheng, C.H., "A Non-Linear Non-Dimensional Model for Free-Piston Thermal-Lag Stirling Engines," *Energy Procedia*, Vol.61, pp. 2662-2665, June 2015. (Non-SCI)

Hao Lv, Wang, X.D., Wang, T.H., Cheng, C.H., "Improvement of transient supercooling of thermoelectric coolers through variable semiconductor cross-section, accepted by *Applied Energy*, Dec. 2015.

Wu, S., Cheng, C.H.; Hsiao, Y.J., Juang, R.C., Wen, W.F., "Fe₂O₃ Films on Stainless Steel for Solar Absorbers," accepted by *Renewable & Sustainable Energy Reviews*, Dec. 27, 2015.

Yang, H.S. and Cheng, C.H., "Stability Analysis of Thermal-Lag Stirling Engines," submitted to *Energy Conversion and Management*, December 2015.

Yang, H.S., Cheng, C.H. "Theoretical Solutions for Power Output of Thermal-Lag Stirling Engine," submitted to *International Journal of Heat and Mass Transfer*, December 2015.

Cheng, C.H. and Chen, Y.F. "Introducing SCGM Scheme into Volume-of-Solid Function Method for Topology Optimization of Conduction Paths," submitted to *International Journal of Heat and Mass Transfer*, December 2015.

Cheng, C.H., Chen, Y.S., Tsai, H.Y., Lin, D.T.W. and Chen, Y., "Experimental and Numerical Study of Increasing Specific Electromagnetic Waves Absorptivity by Using Metamaterial Structures," submitted to *Solar Energy*, February 4, 2016.



SCIENTIFIC EXPERTISE AND CURRENT RESEARCH ACTIVITIES

Stirling engines; Concentrating solar power systems; Inverse heat transfer; Optimization of thermofluidic systems; Micro thermoelectric coolers; Fuel cells; Molecular dynamics simulation.

(Published more than 135 Journal papers, 250 Conference papers and 30 patents)

Academic Activities:

Corresponding Member, International Academy of Astronautics (IAA).

Associate Editor of Journal of the Chinese Society of Mechanical Engineers (SCI)

Associate Editor of Journal of Aeronautics, Astronautics and Aviation

Editorial Board Member of Four International Technical Journals

Former President of Astronautics and Astronautics Society of Republic of China (AASRC), Taiwan

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