

The 2009 International Conference of Financial Engineering (ICFE'09)

Special Session: “Algorithmic Trading and Strategies”

Session Chair:

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Description of the topic of the session:

Algorithmic trading has increasingly driven transactions in the equity markets of US, Europe, and Asia since the last decade. This phenomenal growth comes from the development of current core algorithmic strategies and from the advancement of new strategies called Complex Event Processing (CEP). In order to suit these needs, this proposal has been submitted for creating a session called “Algorithmic Trading and Strategies” that focuses on the research and development of new programmatic trading strategies. This special session in ICFE'09 will contain discussions regarding algorithm development, quantitative research (strategy design), and analytic prototyping/testing, based on market and academic research.

The special session will solicit papers from researchers, financial IT engineers and quantitative analysts working in New York metropolitan area (also London, Tokyo, Hong Kong, and other financial area).



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BIOGRAPHY:

Dr. Masato R. Nakamura obtained his Bachelor of Engineering in Metallurgical Engineering (1996) and Master of Engineering in Materials Science and Engineering (1998), at Hokkaido University, Sapporo, Japan. After he graduated, he joined Mitsubishi Space Software CO., LTD as a systems engineer and worked with marine researchers in the area of scientific computing such as numerical analysis and programming for ocean models at Computer and Information Division, Japan Marine Science and Technology Center (JAMSTEC), or Japanese NOAA (National Oceanic and Atmospheric Administration). In 2008, he obtained a doctoral degree in the area of stochastic modeling of solid waste processing at Department of Earth and Environmental Engineering, Columbia University. As a solutions architect and R&D engineer at Quantitative Research Laboratory, ITOCHU Technology, Inc., he is currently working for several R&D projects related to and stochastic modeling in the financial industry, as well as green technology in the IT industry.

RESEARCH INTEREST:

Quantitative analysis and stochastic modeling for use of characterization of complex phenomena in financial engineering, green technology, and materials science; development and application of estimation tools for market data; waste-to-energy combustion chamber design; transport phenomena; computational fluid dynamics (CFD); flow and mixing process modeling such as granular flow and size segregation; green IT/computing such as green data center management for high energy efficiency; Monte Carlo simulation; implanted ion diffusion during thermal treatments in semiconductor; radiation-induced segregation in nuclear reactor materials; numerical modeling of Brownian motion in the financial market of natural resources as well as foreign exchange and equities.

EDUCATION:

Columbia University, New York, NY

Doctor of Engineering Science (Eng. Sc. D.), Earth and Environmental Engineering, 2008

- Stochastic simulation and integrated modeling of waste-to-energy (WTE) technology.
- Quantitative analysis of renewable energy and sustainable development.

Hokkaido University, Sapporo, Japan

Master of Engineering, Materials Science and Engineering, 1998

- Numerical analysis of diffusion and electrical activation of impurities and point defects in semiconductors.

Bachelor of Engineering, Metallurgical Engineering, 1996

- Developed a diffusion model in order to solve partial differential equations (PDEs) and rate equations.

Asahikawa National College of Technology (ANCT), Asahikawa, Japan

Associate of Engineering, Electrical Engineering, 1992

PROFESSIONAL EXPERIENCE:

Quantitative Research Laboratory, ITOCHU Technology, Inc. (ITI), New York, NY

Solutions Architect and R&D engineer, 2008 - present

Managed Quantitative Research Laboratory in New York Office for Research & Development of stochastic modeling and quantitative analysis for following projects:

- Financial Engineering Project
 - Developed algorithmic trading strategies, including quantitative research (strategy design), analytic prototyping, and application development, based on marketing and academic research.
- IT Solutions Project
 - Organized and operated training seminar series on financial engineering and stochastic modeling/simulation to customers including quantitative analysts, traders, systems engineers.
 - Assisted senior systems engineers who work at The Bank of Tokyo-Mitsubishi UFJ Ltd.
- Green Technology Project
 - Involved and participated in evaluation process of vender's technologies, especially from the aspect of environmental engineering, or "Green Technology/Green IT."
 - Researched Energy efficiency in Green Data Centers.

Earth Engineering Center (EEC), Columbia University, New York, NY

Research Associate, 2008-present

- Analyzed size segregation phenomena in solid waste processing.
- Researched a next generation combustion chamber design.

Junior Research Associate, 2002-2008

- Analyzed transport and mixing phenomena in a combustion chamber using MATLAB programming.
- Participated and supported research activities of WTERT members maintaining and operating a waste-to-energy (WTE) reference database system (SOFOS).

Earth Institute, Columbia University, New York, NY

Research Assistant, 2003

- Quantitative simulation of Municipal Solid Waste Processing.
- Contributed founding and managing the Waste-To-Energy Research and Technology (WTERT) Council

CAC CO. at RECRUIT CO., LTD, Tokyo, Japan

Systems Engineer of Database servers, 2001

- Coded for efficient transaction of time series events.
- Operated and managed Oracle database servers.
- Created and updated shell scripts.

Mitsubishi Space Software CO., LTD at Japan Marine Science and Technology Center (JAMSTEC),
Yokosuka, Japan

Systems Engineer of Unix & Vax servers, 1999-2000

- Consulted and supported marine researchers
- Contributed scientific computing and programming (CFD, MATLAB)
- Operated calculation servers and mail & www servers
- Managed networking (including Cisco Routing and Switching)

Teaching Experience:

Quantitative Analysis Group, New York Branch, Bank of Tokyo-Mitsubishi UFJ (BTMU), New York, NY

Lecturer in a training seminar 2008

- Organized a training seminar and taught MATLAB programming for 6 financial mathematicians, and engineers
- Trained MATLAB toolboxes (curb fitting, financial, and derivatives toolboxes)

School of Engineering and Applied Science (SEAS), and Graduate School of Architecture, Planning and Preservation (GSAPP), Columbia University, New York, NY

Teaching Assistant (TA) 2005

- Taught Environmental Engineering in E4260 Urban Ecology Studio (40 graduate students) class
- Worked with Professors Nickolas Themelis, Phil Simmons, Laurie Hawkinson and Kate Orff

SKILLS:

C/C++, C#, Java, VBA, FORTRAN, MATLAB, Mathematica, awk, Oracle, Perl, Unix, Linux, Open VMS (VAX), Cisco Routing and Switching.

HONORS AND AWARDS:

Solid Waste Processing Division, American Society of Mechanical Engineers (ASME), New York, NY

Winner of ASME Solid Waste Processing Division Scholarship Program Award, 2003-2004

Department of Earth and Environmental Engineering (DEEE), Columbia University, New York, NY

DEEE Fellowship, 2002- 2008

PROFESSIONAL AFFILIATION:

American Society of Mechanical Engineers (ASME)

American Physical Society (APS)

International Association of Engineers (IAENG)

International Association of Financial Engineers (IAFE)

Japan Society of Waste Management Experts (JSWME)

PUBLICATIONS: (*Peer reviewed)

* M.R. Nakamura, M.J. Castaldi, and N.J. Themelis, "Stochastic and physical modeling of motion of municipal solid waste (MSW) particles on a waste-to-energy (WTE) moving grate" submitted to International Journal of Thermal Sciences (2008)

* M. Nakamura, M.J. Castaldi, and N.J. Themelis, "Numerical analysis of size reduction of municipal solid waste particles on the traveling grate in a waste-to-energy combustion chamber," Proc. 14th annual North American Waste To Energy Conference (NAWTEC14), pp. 125-130, Tampa, FL (2006)

M. Nakamura, M.J. Castaldi, and N.J. Themelis, "Measurement of Particle Size and Shape of New York City Municipal Solid Waste and Combustion Residues Using Image Analysis," Proc. 16th Japan Society of Waste Management Experts (JSMWE) Fall Conference, pp. 1-3, Sendai, Japan (2005)

M. Nakamura, M.J. Castaldi, and N.J. Themelis, "Markov Chain Simulation of Solid Waste Fuel Flow and Mixing on the Reverse Acting Grate," Proc. 15th Japan Society of Waste Management Experts (JSMWE) Fall Conference, pp. 43-45, Takamatsu, Japan (2004)

* M. Nakamura, "Report on the 2003 Fall Meeting of Waste-to-Energy Research and Technology (WTERT) Council in New York City," (Written in Japanese) Waste Management Research Vol. 15, No. 4 pp. 213-215, JSMWE (2004)

* M. Nakamura, and N. J. Themelis, "Modeling of Solid Waste Flow and Mixing on the Traveling Grate of Waste-to-energy Combustion Chambers," Proc. 12th annual North American Waste To Energy Conference (NAWTEC12) pp. 273-282, Savannah, GA (2004)

* M. Nakamura, H. Zhang, K. Millrath, and N. J. Themelis, "Modeling of Waste-to-Energy Combustion with Continuous Variation of the Solid Waste Fuel," 2003 ASME ICMEE, Washington, D.C. (2003)

M. Nakamura, N. Sakaguchi, S. Watanabe, and H. Takahashi, "Excess Defect Diffusion during Annealing in Ion-Implanted Semiconductor," International Symposium for Advanced Research of Energy Technology, Sapporo, Japan (1998)

* S. Watanabe, N. Sakaguchi, K. Kurome, M. Nakamura, and H. Takahashi, "On the Mechanism of Radiation-induced Segregation," Journal of Nuclear Materials, 240. pp. 251-253 (1997)

* S. Watanabe, N. Sakaguchi, N. Hashimoto, M. Nakamura, H. Takahashi, C. Nambe and N. Q. Lam, "Radiation-induced Segregation Accompanied by Grain Boundary Migration in Austenitic Stainless Steel," Journal of Nuclear Materials, 232. pp. 113-118 (1996)

PROFESSIONAL PRESENTATIONS AND POSTERS:

M.R. Nakamura, M.J. Castaldi, and N.J. Themelis, "Computational and experimental studies of the flow, mixing, size segregation phenomena of heterogeneous granular materials," presentation at the 61st Annual Meeting of the American Physical Society (APS) Division of Fluid Dynamic (DFD) San Antonio, Texas, (2008).

M. Nakamura, M.J. Castaldi, and N.J. Themelis, "Physical and Stochastic Modeling of Mixing Phenomena of Municipal Solid Waste (MSW) Particles on a Traveling Grate," poster at Waste-To-Energy Research Technology (WTERT) Council Fall Meeting of 2006, New York, NY. (2006)

M. Nakamura, M.J. Castaldi, and N.J. Themelis, "Numerical Analysis of size reduction of municipal solid waste particles on the traveling grate in a waste-to-energy combustion chamber," presentation at 14th annual North American Waste To Energy Conference (NAWTEC14), Tampa, FL (2006)

M. Nakamura, M.J. Castaldi, and N.J. Themelis, "Measurement of Particle Size and Shape of New York City Municipal Solid Waste and Combustion Residues Using Image Analysis," poster. 16th Japan Society of Waste Management Experts (JSMWE) Fall Conference, Sendai, Japan (2005)

M. Nakamura, M.J. Castaldi, and N.J. Themelis, "Transport and Reaction Phenomena of Municipal Solid Waste (MSW) on WTE Grates," poster at Waste-To-Energy Research Technology (WTERT) Council Fall Meeting of 2005, New York, NY. (2005)

M. Nakamura, M.J. Castaldi, and N.J. Themelis, "Markov Chain Simulation of Solid Waste Fuel Flow and Mixing on the Reverse Acting Grate," poster at 15th Japan Society of Waste Management Experts (JSMWE) Fall Conference, Takamatsu, Japan (2004)

M. Nakamura, "Stochastic Simulation of MSW Flow and Mixing on WTE Grates," presentation at Waste-To-Energy Research Technology (WERT) Council Fall Meeting of 2004, New York, NY. (2004)

M. Nakamura, L. El-Youssef, M. J. Castaldi, and N. J. Themelis, "Size and Shape Analysis of Particles of Municipal Solid Wastes and Waste-To-Energy Combustion Residues," poster at Waste-To-Energy Research Technology (WERT) Council Fall Meeting of 2004, New York, NY. (2004)

M. Nakamura, "Modeling of Solid Waste Flow and Mixing on the Traveling Grate of Waste-to-energy Combustion Chambers," presentation at 12th annual North American Waste-To-Energy Conference (NAWTEC 12), Savannah, GA. (2004)

M. Nakamura, "Modeling of Waste-to-Energy Combustion with Continuous Variation of the Solid Waste Fuel," presentation at the 2003 ASME ICMEE, Washington, D.C. (2003)

M. Nakamura, "Simulation of Solid Waste Components and Combustion Processes in a WTE incinerator," presentation at the International Symposium for Advanced Research of Energy Technology, Sapporo, Japan (2003)

M. Nakamura, "Excess Defect Diffusion during Annealing in Ion-Implanted Semiconductor," presentation at the International Symposium for Advanced Research of Energy Technology, Sapporo, Japan (1998)

M. Nakamura, "Computer Simulation of Diffusion and Electrical Activation of Impurity and Point Defects in Crystalline Silicon," poster session at the Gordon Research Conference on Materials Processes Far from Equilibrium, NH. (1997)

REFERNCES:

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