

## 6. AIChE Annual Meeting

11月16日から21日まで、100周年記念大会としてペンシルバニア州フィラデルフィアで開催された。5000名以上の参加者が750を超えるセッションで活発な発表、討論が行われた。主なセッションを以下に記す。

詳細は <http://www.aiche.org/conferences/past/2008annual.aspx> を参照してください。個別発表の要旨が掲載されているものもある。

### ○Topical Conferences

T2: 5th CAPE-OPEN US Conference CAPE (コンピュータ支援プロセス工学) –OPEN 会議

T3: Annual Meeting of the American Electrophoresis Society (AES) 電気泳動学会年会

T4: Sustainable Biorefineries Topical Conference バイオリファイナリーの最新の話題

- Developments in Biobased Alternative Fuels バイオベース代替燃料
- Sustainable Biomass Feedstock Production and Supply for the Emerging Biorefinery Industry  
バイオマス原料の生産とバイオリファイナリー工業への供給
- Catalytic Conversion of Renewable Resources to Synthesis Gases and Pyrolysis Oils  
再生可能資源の合成ガスおよび熱分解オイルへの触媒による転換
- Pretreatment of Lignocellulosic Biomass and Interactions with Other Processing Steps  
リグノセルロースの前処理
- Reactor Engineering for Biomass Feedstocks  
バイオマス原料用の反応装置工学
- Biological Conversions and Processes for Renewable Feedstocks  
再生可能資源の生物学的転換とプロセス
- Chemical and Catalytic Conversions and Processes for Renewable Feedstocks  
再生可能資源の化学的、触媒的転換とプロセス
- Integrated Processes for Biochemical Conversion of Renewable Feedstocks to Fuels and Chemicals  
再生可能資源の燃料および化学品への生物化学的転換プロセス
- Life Cycle Analysis of Renewable Feedstock-Based Processes and Products  
再生可能資源をベースとしたプロセス、製品のLCA
- Sustainable Biorefineries Plenary Session - Invited Speakers on five high profile topics:  
バイオリファイナリーの基調講演 5つのトピックについて  
(1) Challenges in Making Cellulosic Fuels (2) Biofuels (3) Developing Bioeconomy  
(4) Future of Biorefining (5) Renewable Resources for Ethanol Production

T5: Green Engineering and Sustainability in the Pharmaceutical Industry Topical Conference

製薬工業におけるグリーンエンジニアリングと持続可能性

- Benign/Safer Solvents in Pharmaceutical Processing - Current practices, emerging trends and future directions will be discussed. Case studies of environmental improvements resulting from using greener solvents will be assessed. 環境にやさしい、安全な溶媒
- Pharmaceutical Environmental Metrics / LCA – Tools and measures to quantify the environmental footprint or 'greenness' of pharmaceutical and fine chemical process and products. Life cycle assessment (LCA) techniques and life cycle thinking are discussed as part of the metrics.  
製薬工業の環境影響評価、LCA
- Batch to Continuous Pharmaceutical Processing Challenges - Converting a batch API process into continuous process is a big challenge but the potential environmental and sustainability rewards are great. Developmental chemistry, engineering, Quality Control and regulatory issues are discussed. バッチ反応から連続反応へ
- Green Reactions in the Pharmaceutical Industry - Topics include green reaction pathways, increasing the efficiency of reactions, using enzyme, biocatalysts, and emerging trends / future directions in green reactions. Modeling, experimental investigations and case studies are included.  
グリーンな反応

- Green Separations in the Pharmaceutical Industry – Topics include design, operation, and optimization of separation technologies, highly-selective separation methods such as ionic liquids, membrane separation, supercritical fluid extraction and chromatography. 分離方法
- Government Programs and Partnerships – Papers from EPA, RCRA, FDA, and Industrial Pharmaceutical Representatives will be Presented 政策課題と協調
- The Business Case for Sustainability in the Pharmaceutical Industry - Turning green science and technology into triple profit business cases ビジネス・ケース (業務プロセス改善の提案)
- Green Engineering and Sustainability in the Pharmaceutical Industry Poster Session – Aspects of green chemistry, green engineering, sustainability and environmental issues in pharmaceutical development and manufacture. ポスターセッション

T6: AIChE Centennial: Chemical Engineering Education: Past and Future

100周年記念：化学工学の教育

T7: Trace Contaminants in Water: Genesis, Rapid Detection and Sustainable Removal Processes

水の微量汚染物質

T8: Hydrogen Production for a Hydrogen Economy Topical Conference 水素の製造

T9: Sensors Topical Conference センサー

TA: Systems Biology Topical Conference システムバイオロジー

TC: Fuel Cells and Alternative Fuel Systems Topical Conference 燃料電池および代替燃料システム

- Fuel Cell Technology - Desulphurization, Modeling, Optimization and Performance Characteristics 燃料電池の技術
- Fuel Cell Portable Power Systems - Thin Film, Microfibers, Microfluidics and Methanol Reforming 燃料電池系可搬動力システム
- Fuel Cell Durability and Water Transport- Carbon Corrosion, Catalyst Deactivation, Microstructure Changes, and Nanostructures 燃料電池の耐久性と水の輸送
- Novel Electrochemistry and Materials for Fuel Cells - Double walled Carbon Nanotubes, Ionic Liquids, Layered Double Hydroxides, Glass Composite and Copolymer Films 燃料電池のための新しい電気化学と材料
- Alternative Fuels and Enabling Technologies 代替燃料、それを実現するための技術

TD: Nanomaterials for Energy Applications Topical Conference

エネルギーのためのナノ材料

TE: Sustainability Topical Conference 持続可能性

- Sustainability Plenary - Invited Speakers with focus on Biomass and Waste Vegetable Oils, Chaired by Subhas Sikdar, Acting Associated Director for Health, National Risk Management Research Lab, US EPA 基調講演
- Sustainable Energy and Sustainable Fuels 持続可能なエネルギー、持続可能な燃料
  - Biodiesel
  - Gasification of biomass fuels
  - Solar Hydrogen combined with biomass fuels
- Prediction of Sustainability Performance by Computation 計算による持続可能性遂行能力の予測
  - Fuzzy Logic and Fuzzy Decision Making
  - Exergy Dissipation and Growth
  - Monte Carlo based Simulation
  - Computational Chemistry
  - Life Cycle Assessment
- Design for Sustainability 持続可能性を志向した設計
  - Green Chemistry and Engineering for Sustainability
  - Green Manufacturing
  - Green Supply Chain
- Sustainability Education 持続可能性の教育

- Systems Analysis of Sustainability 持続可能性のシステム解析
- Practical Approaches to Sustainability and Business Success 成功へつながる現実的手法  
Reducing the environmental footprint while keeping production costs affordable  
Alternative products designs and sustainable production routes that benefit from re-thinking of conventional concepts

TF: Pilot Plant Centennial Celebration Topical Conference パイロットプラント

TG: International Fusion Energy Technology (ITER) Topical Conference 核融合

TH: AIChE Centennial: ChE Research - Past and Future Topical Conference 100周年記念: 研究

TI: The Petroleum Environmental Research Forum (PERF) on Biofuels Topical Conference バイオ燃料

TJ: InterAmerican Confederation of Chemical Engineering – featured sessions from 23rd IACChE Congress 米州化学工学連合会議

## ○Core Programming

### 1. Engineering Sciences and Fundamentals (110 sessions) エンジニアリングの科学と基礎

- Thermodynamics and Transport Properties 熱力学と輸送  
John O'Connell 70th Birthday Celebration I, II and III  
Thermodynamic Properties and Phase Behavior I, II and III  
Thermodynamics of Polymers I
- Interfacial Phenomena 界面の現象  
Interfacial Phenomena Plenary Session  
In Honor of Clarence Miller: Invited Talks
- Transport Processes 輸送プロセス  
Fundamental Research in Transport Processes I and II  
Transport Processes in Nanoscale Systems I and II
- High Pressure Studies 高圧  
Reactions at High-Pressures
- Fluid Mechanics 流体力学  
In Honor of Bud Homsey I: Invited Talks  
In Honor of Bud Homsey II: Interfacial Flows  
In Honor of Bud Homsey III: Stability and Nonlinear Hydrodynamics  
Novel Numerical Methods In Fluid Mechanics

### 2. Separations (70 sessions) 分離

- 100 Years of Separations Science, Technology and Education I and II 分離科学の100年
- Distillation and Absorption 蒸留と吸収  
Distillation Honors I and II
- Crystallization and Evaporation 結晶化と蒸発  
Advances / Case Studies in Crystallization and Post Crystallization Processing  
Fundamentals of Nucleation
- Extractions 抽出  
New Developments in Extractive Separations
- Membrane-Based Separations 膜分離  
in Honor of Prof Kamalesh Sirkar I and II
- Adsorption and Ion Exchange 吸着とイオン交換  
Plenary: Fundamentals & Applications of Adsorption & Ion Exchange I and II
- Fluid-Particle Separations 粒子と液体の分離  
Particle Formation and Crystallization Processes from Liquids or Slurry
- Bioseparations 生物学的分離  
Plenary Session II on Bioseparations: Novel Approaches

### 3. Management (5 sessions) 管理手法

- Project Management

- Managing Technological Innovations
  - Innovation Management: Roles of University, Industry and Government
  - Engineering to Management Transition: Early Career Opportunities
4. Materials Engineering and Sciences (80 sessions) 材料工学と材料科学
- Plasma Science and Thin Film Applications プラズマ科学と薄膜への応用  
In Honor of Herbert H. Sawin I, II and III
  - Polymers 高分子  
Plenary Session: Emerging Areas in Polymers  
Structure and Properties of Polymers I, II and III, and IV: Networks and Gels  
Polymer Thin Films and Interfaces I and III
  - Biomaterials バイオ材料  
Biomaterials I, II  
Biomaterials for Gene Delivery I and II, and for Drug Delivery I, II and III  
Biomaterial Scaffolds for Tissue Engineering I and II  
Injectable Biomaterials, Polymeric Biomaterials I and II and Natural Biomaterials
  - Electronics and Photonics エレクトロニクスとフォトニクス  
Nanomaterials for Photovoltaics
  - Composites 複合材料  
Modeling of Composites
5. Environmental (over 40 sessions) 環境
- Water Sustainability, Purification and Resource Management 水の持続可能性、精製、資源  
Novel Membranes and Processes for Water Treatment and Purification
  - Environmental Green Topics 環境保護に関する話題
  - Climate Change 気候変動
  - Emission Controls, Atmospheric Studies and Air Quality 放出の制御、大気の研究、空気の質  
Symposium In Honor of Len Peters Contributions to Air Pollution Research and Education I and II
  - Legislation and Regulatory Hot Topics 立法、規制
  - Nuclear Environmental Issues 核に関する環境問題  
Contaminant Transport and Site Remediation I and II  
Oxidation and Reduction Process Applications -Liquid Phase
  - Environmental issues in Nanotechnology and Biotechnology  
ナノテクノロジー、バイオテクノロジーの環境問題  
Fundamentals of Environmental Biotechnology  
Biomass Processing beyond Ethanol  
Environmental Applications of Nanotechnology and Nanomaterials  
Regulation of Nanotechnology Product Sale and Use and Nano Toxicology
6. Catalysis and Reaction Engineering (over 55 sessions) 触媒、反応工学
- In Honor of Doraiswami Ramkrishna I and II - Invited Speakers
  - In Memory of Rutherford Aris I, II and III
  - Fundamentals 基礎  
Fundamentals of Supported Catalysis I, II, III and IV  
Fundamentals of Oxide Catalysis  
Fundamentals of Surface Reactivity
  - Computational Catalysis 計算機科学による触媒作用  
Computational Catalysis I, II, III and IV  
Computational Fluid Dynamics in Chemical Reaction Engineering
  - Catalytic Hydrogenation and Fuel Cells 接触的水素化と燃料電池  
Catalytic Hydrogen Generation - General I, II and III  
Fuel Processing

- Catalytic Hydrogen Generation for Fuel Cell Applications I and II
- Electrocatalysis Applications for Fuel Cells I and II
- Combustion, Modeling and Synthesis 燃焼、モデル化と統合  
Combustion Reaction Engineering
- Environmental Catalysis and Green Chemistry 環境にやさしい触媒とグリーンケミストリー  
Environmental Catalysis I, II and III
- Catalyst Preparation and Processes 触媒調製  
Science and Engineering of Catalyst Preparation I and II
- 7. Process Development and Nuclear Engineering (13 sessions) プロセス開発と原子核工学
  - Process Development プロセス開発  
Plenary In Honor of Kamlesh Bhatia: Invited Speakers  
Development and Operating Histories of Chemical Processes  
Applications of Chemometrics for Process Development  
Career Development in the Chemical Processing Industry  
Experiences with Product Design Capstone Courses and Projects  
Molecular Modeling for Product Design  
Advances in Process Intensification I and II  
Process Development for Sustainability I and II  
Case Studies In Product-Centered Process Development
  - Nuclear Engineering 原子核工学  
Chemical Engineering Advances In the Nuclear Fuel Cycle  
Engineering Applications of Radioisotopes  
Progress toward Energy Sustainability and Security
- 8. Food, Pharmaceutical and Bioengineering (over 70 sessions) 食料、製薬とバイオ工学
  - Food, Pharmaceutical and Bioengineering Plenary 基調講演
  - Food, Pharmaceutical and Bioengineering Division Forum 部会
  - Quality by Design- Invited Talks and Round Table Discussion 設計による品質
  - Systems Biology and Bioinformatics システムバイオロジーとバイオインフォマティクス  
Systems Biotechnology I and II  
Mathematical Approaches in Systems Biology  
Metabolic Engineering and Bioinformatics I, II and III
  - Pharmaceutical: 製薬  
Quality by Design in Industry  
Scale-up Issues in Formulation Development  
Reaction Engineering  
Crystallization I and II  
Biopharmaceutical Process Development  
Pharmaceutical Process Development  
Modeling I and II  
Continuous Processing  
Population Balance Modeling of Particulate Processes and PAT Applications
  - Food 食料  
Food Processing and Safety  
Nanotechnology in Food Science
  - Protein Engineering タンパク質工学  
Thermodynamics of Protein Folding and Aggregation  
Therapeutics  
Computational Approaches  
Expression and Post-Translational Modification  
Structure

- Function and Stability
- Cell Technology 細胞工学
  - Advances in Cell Culture I and II
  - Cell Adhesion and Migration I and II
  - Stem Cells in Tissue Engineering I and II
  - Biomaterial-Cell Interactions In Tissue Engineering I and II
- 9. Fuels, Petrochemicals, Forest and Plant Bioproducts (14 sessions) 燃料、石油化学、森林とバイオ製品
  - Fuels and Petrochemicals 燃料と石油化学
    - Alternative Fuels and Enabling Technologies I, II, III, and IV
    - Battery and Fuel Cell Energy Storage on Vehicles
    - Catalytic Biofuel Refining
    - Catalytic Biomass Conversion to Chemicals
    - Catalytic Biomass Gasification and Pyrolysis
  - Forest and Plant Bioproducts 森林と植物バイオ製品
    - Biobased Material Composites: Process & Product Applications I and II
    - Forest Biorefinery Processes: Wood Extraction & Processing for Biofuels and Biobased Products
    - Topics in Energy from Forest Bioproducts: Economics, Life Cycle Analysis, and Improved Thermal Processes
    - Processes in the Forest Products Industry: Separations and Transport
- 10. Particle Technology Forum (PTF) (over 50 sessions) 粒子の技術
  - Particle Production and Characterization 粒子の製造と分析・評価
    - Particle Formation Processes from Liquids and Gases
    - Characterization and Measurement In Powder Processing
    - Characterization of Engineered Particles and Nano-Structured Particles
    - Measurement, Monitoring & Characterization Methods for Particulate Systems
  - Fluidization and Fluid-Particle Systems 流動化と流体-粒子系
    - Applications of Fluidization
    - Circulating Fluidized Beds
  - Solids Flow, Handling and Processing 固相流、取扱いと処理
    - In Honor of George Klinzing's 70th Birthday
  - Nanoparticles ナノ粒子
    - Nanoparticles for Functional Coatings
    - Functional Nanoparticles and Nanocoatings on Particles
  - Energetics エネルギー論
    - Energetics Environmental & Lifecycle
    - Nano-Energetic Materials I and II
  - Modeling モデル化
    - Modeling and Scaleup of Nanoparticle Processes
    - Dynamics and Modeling of Particulate Systems I and II
    - Population Balance Modeling for Particle Formation Processes
- 11. North American Mixing Forum (NAMF) (11 Sessions) 混合
  - Mixing in Microdevices マイクロ装置での混合
  - Mixing in Confined Jets and High-Intensity Continuous Contactors
    - 拘束噴流および連続接触器での混合
  - Single Phase Mixing and Multi-Phase Mixing 単相混合と多相混合
  - Novel Experimental Methods in Mixing 新しい混合実験方法
  - Novel Computational Methods in Mixing 計算機科学的手法
- 12. Computational Molecular Science and Engineering Forum (11 sessions) 計算機による分子の科学
  - Modeling モデル化
    - Industrial Applications of Computational Chemistry and Molecular Simulation

- Simulation シミュレーション
  - First-Principles Simulations I and II
  - Integrated Multiscale Molecular Simulation
  - Recent Advances In Molecular Simulation Methods I and II
  - The Fifth Industrial Fluid Properties Simulation Challenge
- Symposium Honoring H. Ted Davis I and II
- Overview of An International Assessment of Research and Development in Simulation-Based Engineering and Science シミュレーションに基づいたエンジニアリングと科学
- 13. Nanoscale Science and Engineering Forum (NSEF) (over 40 sessions) ナノスケールの科学と工学
  - General Topics 一般
    - Chemical Engineering Principles for Nanotechnology I and II
    - Nanofabrication and Nanoscale Processing
    - Templated Assembly of Inorganic Nanomaterials
    - Self and Directed Assembly at the Nanoscale I and II
    - Nanoelectronic Materials I and II
    - Nanoscale Science & Engineering in Biomolecular Catalysis I, II and III
    - Education Issues in Nanotechnology
    - Commercialization of Nanotechnology
  - Bionanotechnology バイオナノテクノロジー
    - Bionanotechnology: Plenary Session I and II
    - Bionanotechnology for Gene and Drug Delivery I, II and III
    - Magnetic Nanoparticles in Biotechnology and Biomedicine I and II
    - Nanotechnology and Nanobiotechnology for Sensors I, II and III
    - Nanotechnology for Biotechnology and Pharmaceuticals I and II
    - Micro- and Nanodevices for Targeted Therapeutics
    - Nanotechnology for In Vivo and in Vitro Imaging
    - Sensors and Bio-Imaging Contrast Agents at the Cellular Level I and II
    - Nanostructured Biomimetic and Biohybrid Materials and Devices
    - Self-Assembled Biomaterials I and II
    - Nanostructured Scaffolds for Tissue Engineering
  - Carbon Nanotubes カーボンナノチューブ
    - Synthesis
    - Characterization, Functionalization, and Applications
    - Adsorption and Transport
    - Fundamental Issues
    - Applications
  - Nanowires ナノワイヤー
    - Synthesis
    - Modeling, Integration Strategies and Applications
    - Bulk Production, Dispersions and Composites
    - Applications to Photovoltaics or Renewable Energy
    - Applications to Sensors, Devices and Energy Storage
  - Nanoscale Structure in Polymers 高分子のナノ構造
    - Self-Organization of Polymers at Surfaces and Interface I and II
    - Polymers as Functional Components of Micro- and Nanodevices
    - Nanostructured Polymeric Materials
    - Polymer Nanocomposites
- 14. Energy and Transport Process (18 Sessions) エネルギーと輸送課程
  - Oil Characterization & Thermodynamics to Flow Assurance I and II 石油の性質と熱力学
  - Oil Shale and Oil Sands オイルシェールとオイルサンド

- From Fuels to Emissions: Fundamentals of Conversion and Reductions 燃料から放出まで
  - Advances In Gasification Research ガス化研究のシンポ
  - Oxycombustion of Coal – Needs, Opportunities, and Challenges 石炭の酸素燃焼
  - Advance Modeling Methods in Carbon Dioxide Sequestration 二酸化炭素隔離の新しいモデル
  - Chemical Looping Processes 化学の閉回路プロセス
  - Gasification and Syngas Refining ガス化と合成ガス改質
15. Education (ED) (48 sessions) Department Heads Forum (04K01) 教育
- New Faculty Forum (04M01)
  - National Science Foundation Workshop I (04B01)
  - National Science Foundation Workshop II (04B02)
  - Free Forum on Engineering Education 1 (04008)
  - Free Sunday Workshop: Polishing Your Problem Solving Skills (04010)
  - Free Sunday Workshop: Career Planning for Prospective Faculty (04000)
  - Free Tuesday PM Workshop: How to Teach Capstone Design (04011)