6th Annual Knowledge Foundation Conference on Next-Generation Energy Storage 2016

San Diego, California, USA
18 - 20 April 2016

ISBN: 978-1-5108-2426-3

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571

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Printed by Curran Associates, Inc. (2016)

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6th Annual Knowledge Foundation

NEXT-GENERATION 2016 ENERGY STORAGE

April 18-20, 2016 | San Diego, CA

Monday, April 18

TRACK 1: MOBILE POWER	TRACK 2: NEXT-GENERATION BATTERIES, MATERIALS & CHEMISTRIES	TRACK 3: STATIONARY ENERGY STORAGE
11:00 am Registration		
	ADVANCED LITHIUM SOLUTIONS	**REGULATORY PUSH VS. MARKET PULL**
1:15 pm Organizer's Opening Remarks *Victoria Mosolgo, Associate Conference Producer, Knowledge Foundation, a Division of Cambridge EnerTech* *Craig Wohlers, Executive Director, Conferences, Knowledge Foundation, a Division of Cambridge EnerTech*		**1:15 pm Organizer's Opening Remarks** *Mary Ann Brown, Executive Director, Conferences, Knowledge Foundation, a Division of Cambridge EnerTech*
1:20 Chairperson's Opening Remarks *Kang Xu, Ph.D., Senior Research Scientist, Electrochemistry Branch, U.S. Army Research Laboratory*		**1:20 Chairperson's Opening Remarks** *Reyad Fezzani, Chairman & CEO, Regenerate Power*
1:30 JOINT KEYNOTE PRESENTATION **Battery Trends and Industry Needs for Consumer Electronics** *Robert Ashcraft, Ph.D., Engineer/Manager, Open Innovation Group, Samsung Research America*		**1:30 KEYNOTE PRESENTATION** **Battery Discovery and Development in the Joint Center for Energy Storage Research** *Lynn Trahey, Ph.D., Research Integration Officer, Joint Center for Energy Storage Research & Research Scientist, Argonne National Laboratory*
MATERIALS, CELL DESIGN, TESTING & MONITORING	**ADVANCED LITHIUM SOLUTIONS (CONT.)**	**REGULATORY PUSH VS. MARKET PULL (CONT.)**
2:15 Solid-State Lithium Metal Electrodes as an Enabling Technology for Next-Generation Batteries for Consumer Electronic Applications *Steve Visco, Ph.D., CEO and CTO, PolyPlus Battery Company*	**2:15 Materials in Energy and Extreme Environments: Watching Nanoscale in Action** *Ju Li, Ph.D., Professor, Nuclear Science & Engineering and Department of Materials Science & Engineering, Massachusetts Institute of Technology*	**2:15 A Market-Making Moment for Large-Scale Energy Storage?** *Elliot Hinds, J.D., Partner, Energy, Crowell & Moring LLP*
2:45 Powering the Internet of Things *Matthew Wendling, Associate Fellow of Technology, Energizer*	**2:45 High-Voltage Aqueous Li-Ion Chemistry Enabled by SEI** *Kang Xu, Ph.D., Senior Research Scientist, Electrochemistry Branch, U.S. Army Research Laboratory*	**2:45 Utility-Scale Battery Storage - A Perspective from Market Players** *Reyad Fezzani, Chairman & CEO, Regenerate Power*
	3:15 Late Breaking Presentation	**3:15 Late Breaking Presentation**
3:30 Refreshment Break with Exhibit and Poster Viewing		

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MATERIALS, CELL DESIGN, TESTING & MONITORING (CONT.)	**ADVANCED LITHIUM SOLUTIONS (CONT.)**	**REGULATORY PUSH VS. MARKET PULL (CONT.)**
4:00 Advancements of Innovative Non-Destructive Non-Contact Methods of Testing for Optimization of Materials, Technology and Design, Increasing Efficiency, Improving Reliability and Safety, and Reducing Costs of the Batteries for Portable Electronics *Elena Shembel, Ph.D., D.Sc., Chairman & CEO, Enerize Corporation*	**4:00 Novel Synthesis Approach toward Long-Life Cathode Material** *YoungHo Shin, Ph.D., Principal Process Engineer, Process Technology Research, Argonne National Laboratory*	**4:00 The Impact of High Penetration of PV and Storage Opportunities** *Tom Lovas, Senior Program Manager & Consultant, Cooperative Research Network/Business & Technology Strategies, National Rural Electric Cooperative Association, Inc. (NRECA)*
4:30 A Wireless Contact Stress Sensor for Battery Monitoring *Tim Coogan, Vice President, Applications, MicroMetrics*	**4:30 From Theory to Microgrid - Electrochemical Energy Storage Challenges** *Shirley Meng, Ph.D., Professor & Director, Sustainable Power & Energy Center, University of California, San Diego*	**4:30 PANEL DISCUSSION: BESSs: Lessons Learned and Future Solutions** *Moderator:* *Reyad Fezzani, Chairman & CEO, Regenerate Power* *Panelists:* *Neal Bartek, Distributed Energy Resources Manager, Electric Transmission & Distribution Engineering, San Diego Gas & Electric* *Lynn Trahey, Ph.D., Research Integration Officer, Joint Center for Energy Storage Research & Research Scientist, Argonne National Laboratory* *Joseph R. Heinzmann, Senior Product Manager – Energy Storage Global Grid Connect, General Electric* *Elliot Hinds, J.D., Partner, Energy, Crowell & Moring LLP*
5:00 Cylindrical Pouch Lithium Polymer Cells for Medical Electronic Pills *Shmuel De Leon, CEO, Shmuel De-Leon Energy, Ltd.*	**5:00 Development of a Multi-Electrode Solid-State Li-Air Battery Prototype** *Alexis Laforgue, Ph.D., Research Officer, Materials for Energy Technologies, National Research Council of Canada*	
5:30 Welcome Reception with Exhibit and Poster Viewing		
6:30 Close of Day		

Tuesday, April 19

TRACK 1: MOBILE POWER	TRACK 2: NEXT-GENERATION BATTERIES, MATERIALS & CHEMISTRIES	TRACK 3: STATIONARY ENERGY STORAGE

7:30 am Java and Jive Breakfast Breakout Discussion Groups

Table 1: Battery Safety for Portable and Stationary Applications
Moderator: Shmuel De-Leon, CEO, Shmuel De-Leon Energy, Ltd.

- Battery safety hazards
- Battery safety guidelines
- Battery safety equipment
- Battery safety design
- EV battery safety

Table 2: System Commissioning and Deployment
Moderator: Kevin Fok, Senior Project Manager, LG Chem

- What are the site considerations that need to be factored in?
- What are the installation aspects?
- What kind of testing is needed?
- What do system providers need to improve on?
- What are the challenges that need to be overcome?

Table 3: Batteries with Novel Requirements in Confined Spaces
Moderator: Andy Keates, Principal Engineer, Energy Storage Technology, Intel Corporation

- Performance requirements … temperature, size, self-discharge, flexibility, erratic power demands etc.
- Battery choices available for small or thin devices
- New developments that may serve the needs of small and thin

Table 4: Technologies to Improve Metallic Lithium
Moderator: Alexis Laforgue, Ph.D., Research Officer, Materials for Energy Technologies, National Research Council of Canada

- All ceramic
- Polymer-based
- Lithium metal protecting layers
- Dendrite-prohibiting additives

Table 5: Bridging the Gap between Materials Limitations and Manufacturing Requirements
Moderator: Elena Shembel, Ph.D., D.Sc., Chairman & CEO, Enerize Corporation

- Lots of effort and lots of success have been obtained in the areas of the material science for the development and invention of new electrodes and electrolytes materials for Li batteries
- For the solid electrolytes, examples of the gaps include: problem of distribution of the solid electrolyte inside of porous structure of electrodes; decreasing the interface resistance between the solid electrolyte and electrode; increasing the rate of the vacuum deposition solid electrolyte of the surface of electrode
- For the silicon-based composition for negative electrodes examples of the gaps include: technologies which can provide the strong mechanical strength during cycling without using expensive additives to the silicon-graphite composition; the technologies and equipment, which ensure high-level of cohesion between particles of the compositions; and adhesion of the composition to substrate of the current collector
- Various technologies and equipment, which overcome the barrier between the achievements of the material science for various types of electrodes and electrolytes, and requirements of the manufacture and application of lithium power sources will be discussed and compared. Particular attention will be paid to various non-destructive testing methods equipment for novel electrodes and electrolytes materials during use of them for batteries productions

Tuesday, April 19

TRACK 1: MOBILE POWER	TRACK 2: NEXT-GENERATION BATTERIES, MATERIALS & CHEMISTRIES	TRACK 3: STATIONARY ENERGY STORAGE
7:30 am Java and Jive Breakfast Breakout Discussion Groups (Cont.) **Table 6: Silicon Anodes in Lithium-Ion Batteries** *Moderator: Dee Strand, Ph.D., CTO, Wildcat Discovery Technologies* • Silicon carbon composites • Silicon nanowires **Table 7: How to Make Energy Storage More Effective** *Moderator: William Torre, MSEE, Program Director, Center for Energy Research, University of California, San Diego* • Possible cost reductions • Market barriers • Technology improvements **Table 8: Future of Electrolyte Material** *Moderator: Kang Xu, Ph.D., Senior Research Scientist, Electrochemistry Branch, U.S. Army Research Laboratory* • Which chemistries are most suited to transition to solid electrolytes? • What are the possible applications for solid electrolytes? • What are the major concerns moving forward with this technology? • How can the challenges presented by solid electrolytes be overcome?		
APPLICATION-DRIVEN DEVELOPMENT	**BEYOND LITHIUM TECHNOLOGY**	**GRID INTEGRATION**
9:00 Chairperson's Remarks *Dee Strand, Ph.D., CTO, Wildcat Discovery Technologies*	**9:00 Chairperson's Remarks** *Jun Liu, Ph.D., Director, Energy Processes and Materials Division, Laboratory Fellow, Pacific Northwest National Laboratory*	**9:00 Chairperson's Remarks** *Kevin Fok, Senior Project Manager, LG Chem*
9:05 Battery Considerations for Wearable Electronics◊◊◊ос *Jerry Hallmark, Director, Energy and Power Technologies, Motorola Mobility*	**9:05 Low-Cost Energy Storage Solutions** *Jun Liu, Ph.D., Director, Energy Processes and Materials Division, Laboratory Fellow, Pacific Northwest National Laboratory◊◊◊bк!*	**9:05 Moving the Electric Grid Forward with Energy Storage◊◊◊нлс** *Kevin Fok, Senior Project Manager, LG Chem*
9:35 Diagnostic Studies of High-Energy Density Lithium-Ion Cells◊◊◊bк! *Daniel Abraham, Ph.D., Engineer, Chemical Sciences and Engineering, Argonne National Laboratory*	**9:35 Rechargeable Lithium-Sulfur Batteries: Recent Advances, Challenges and Opportunities◊◊◊bк!** *Min-Kyu Song, Ph.D., Professor, Washington State University*	**9:35 EV Cell Degradation under Electric Utility Grid Operations: Impact of Calendar Aging & Vehicle to Grid Strategies◊◊◊мфн** *Matthieu Dubarry, Ph.D., Assistant Researcher, Hawaii Natural Energy Institute, University of Hawaii at Manoa*
	10:05 Late Breaking Presentation	**10:05 Advancing toward Vehicle-to-Grid Technology◊◊◊нуф** *Satoru Shinzaki, Project Manager, Environmental Business Development Office, American Honda Motor Co., Inc.*
10:20 Coffee Break with Exhibit and Poster Viewing		

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APPLICATION-DRIVEN DEVELOPMENT (CONT.)	**BEYOND LITHIUM TECHNOLOGY (CONT.)**	**GRID INTEGRATION (CONT.)**
11:00 Next-Generation Energy Storage Development of *in situ* Gas Measurements for Lithium-Ion Battery R&D *Dee Strand, Ph.D., CTO, Wildcat Discovery Technologies*	**11:00 Lithium Sulfide (Li2S) Cathode for Next-Generation Lithium Cells** *Yoon Hwa, Ph.D., Postdoc Fellow, Lawrence Berkeley National Laboratory*	**11:00 Modeling & Analysis of Grid-Connected Battery with Renewable Sources** *Anitha Subburaj, Ph.D., Assistant Professor, School of Engineering, Computer Science & Mathematics, West Texas A&M University*
11:30 Data-Driven Battery Product Development: Turn Battery Performance into a Competitive Advantage *Tal Sholklapper, Ph.D., CEO and Co-Founder, Voltaiq, Inc.*	**11:30 Rechargeable Aqueous Sodium-Ion Batteries for (Micro)grid Applications** *Mona Shirpour, Ph.D., Assistant Professor, University of Kentucky*	**11:30 Reducing Grid Integration Risks and Demonstrating Smart Inverter Technologies through Advanced, Full-Scale Testing** *J. Curtiss Fox, Ph.D., Director, Operations, Duke Energy eGRID Center, Clemson University*
12:00 pm Enjoy Lunch on Your Own	**12:00 pm Enjoy Lunch on Your Own**	**12:00 pm FEATURED PRESENTATION: Grid to EV and EV to Grid - Technologies to Enable Energy Storage on the Grid** *Rajit Gadh, Ph.D., Professor, Henry Samueli School of Engineering and Applied Science; Founder & Director, Smart Grid Energy Research Center (SMERC) and UCLA WINMEC Consortium, University of California, Los Angeles*
		12:30 Enjoy Lunch on Your Own
APPLICATION-DRIVEN DEVELOPMENT (CONT.)	**BRINGING NOVEL TECHNOLOGIES TO MARKET**	**BANKING ON BATTERIES**
2:00 Chairperson's Remarks *Jerry Hallmark, Director, Energy and Power Technologies, Motorola Mobility*	**2:00 Chairperson's Remarks** *Andy Keates, Principal Engineer, Energy Storage Technology, Intel Corporation*	**2:00 Chairperson's Remarks** *Wei Wang, Ph.D., Scientist, Energy and Environment Directorate, Pacific Northwest National Laboratory, U.S. Department of Energy*
2:05 Beyond Li-Ion: Utilization of the High-Energy Density of Silver-Zinc in the Button and Coin Cell Miniature Battery Sizes *Jeff Ortega, Ph.D., Director, Research, R&D, ZPower*	**2:05 Advances in Sodium-Ion Energy Storage Batteries Utilizing Liquid and Solid-State Electrolytes** *Linda Nazar, Ph.D., FRSC, Officer of the Order of Canada, Senior Canada Research Chair in Solid State Energy Materials, Department of Chemistry and the Waterloo Institute of Nanotechnology*	**2:05 Increasing the Value of Grid Energy Storage with Hybrid Approaches** *Kimberly McGrath, Ph.D., MBA, Director, Business Development, Maxwell Technologies*

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APPLICATION-DRIVEN DEVELOPMENT (CONT.)	**BRINGING NOVEL TECHNOLOGIES TO MARKET (CONT.)**	**BANKING ON BATTERIES (CONT.)**
2:35 Wireless Charging of Small Connected Devices *Bill von Nowak, Principal Engineer, Qualcomm*	**2:35 Key Challenges and Recent Advances in Rechargeable Magnesium Batteries** *Tom Gregory, Owner, Borealis Technology Solutions LLC*	**2:35 Low-Cost Carbon Surface Passivation for Achieving Exceptionally Long Battery Life** *Alexander Bistrika, Ph.D., President, eChemion, Inc.*
PATENT STRATEGY	**BRINGING NOVEL TECHNOLOGIES TO MARKET (CONT.)**	**BANKING ON BATTERIES (CONT.)**
3:05 The Patent Landscape across the Battery Industry: Patent Acquisition, Enforcement, and Licensing Strategies *Howard Lim, Intellectual Property Attorney, Locke Lord, LLP*	**3:05 From Materials to Automotive Cells: Challenges and Opportunities** *Simon Lux, Ph.D., Engineer, Advanced Battery Technology, BMW of North America, LLC*	**3:05 Valuation of Energy Storage and Role of Redox Flow Batteries** *Wei Wang, Ph.D., Scientist, Energy and Environment Directorate, Pacific Northwest National Laboratory, U.S. Department of Energy*
3:35 Refreshment Break with Exhibit and Poster Viewing		
MARKET OVERVIEW	**BRINGING NOVEL TECHNOLOGIES TO MARKET (CONT.)**	**POWER PARTNERSHIPS**
4:00 Advanced and Post-Lithium-Ion Batteries for Consumer Electronics and Emerging Market Segments *Franco Gonzalez, Senior Technology Analyst, Research, IDTechEx, United Kingdom*	**4:00 High-Energy Solid-State Batteries: Status and Remaining Challenges** *Josh Buettner-Garrett, Ph.D., CTO, Solid Power*	**4:00 Energy Storage: A Critical Component of Miramar's Renewable Microgrid Demonstration** *Mick Wasco, PE, CEM, Installation Energy Manager, Installation & Logistics, Engineering Branch, Marine Corps Air Station Miramar, United States Marine Corps* *Ryan Faries, MSc, Manager, DoD/Civil EO Systems Design, Systems Development Center, Raytheon Space and Airborne Systems* *Tom Stepien, MME, CEO, Primus Power*
4:30 JOINT PANEL DISCUSSION: Powering the Path to Commercialization for Consumer Electronics *Moderator:* *Andy Keates, Principal Engineer, Energy Storage Technology, Intel Corporation* *Panelists:* *Bill von Nowak, Principal Engineer, Qualcomm* *Jerry Hallmark, Director, Energy and Power Technologies, Motorola Mobility* *Robert Ashcraft, Ph.D., Engineer/Manager, Open Innovation Group, Samsung Research America*		**4:45 Design, Installation and Testing of a 2.5 MW/5 MWhr Energy Storage System at the University of California, San Diego** *Michael Liu, North America Regional Manager, Energy Storage, BYD America* *William Torre, MSEE, Program Director, Center for Energy Research, University of California, San Diego*
5:30 Close of Conference		

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Wednesday, April 20

SYMPOSIUM 1: LITHIUM BATTERIES FOR LARGE-SCALE APPLICATIONS	SYMPOSIUM 2: FLEXIBLE BATTERIES
8:00 am Registration and Morning Coffee	
	NOVEL ARCHITECTURES AND BATTERY DESIGNS
8:45 Organizer's Opening Remarks *Craig Wohlers, Executive Director, Conferences, Knowledge Foundation, a Division of Cambridge EnerTech*	**8:45 Organizer's Opening Remarks** *Mary Ann Brown, Executive Director, Conferences, Knowledge Foundation, a Division of Cambridge EnerTech*
8:50 Chairperson's Opening Remarks *Greg Tremelling, Senior Manager, Electrical Engineer, NEC Corporation*	**8:50 Chairperson's Opening Remarks** *Yunfeng Lu, Ph.D., Professor, Chemical & Biomolecular Engineering, University of California, Los Angeles*
9:00 FEATURED PRESENTATION: New Approach for Battery Storage Systems in Industrial Applications and Microgrids◊◊◊cy *Stefan Meir, Ph.D., VARTA Storage*	**9:00 FEATURED PRESENTATION: High-Energy Density Flexible Rechargeable Batteries◊◊◊ппп** *Jaephil Cho, Ph.D., Professor & Director, School of Energy and Chemical Engineering, Ulsan National Institute of Science and Technology (UNIST)*
ADVANCES IN MATERIALS, PACKS, TESTING & CHARGING	**NOVEL ARCHITECTURES AND BATTERY DESIGNS (CONT.)**
9:30 Circuitry Dependence of Parallel-Connected Lithium-Ion Cell Battery System◊◊◊opo *Thorsten Grün, Research Scientist, Competence-E, Karlsruhe Institute of Technology*	**9:30 Design and Integration of Flexible Lithium-Ion Batteries with Wearable Electronics◊◊◊пун** *Abhinav Gaikwad, Ph.D., Research Fellow, Electrical Engineering and Computer Sciences, University of California, Berkeley*
10:00 Design and Operation of Large-Scale Battery Storage Systems◊◊◊ocм *David Lentsch, Director, Business Development, Maxwell Technologies*	**10:00 Polyacrylic Acid-Assisted Assembly of Oxide Particles and Carbon Nanotubes for High-Performance Flexible Battery Anodes◊◊◊рнр** *Yunfeng Lu, Ph.D., Professor, Chemical & Biomolecular Engineering, University of California, Los Angeles*
10:30 Coffee Break with Poster Viewing	
11:00 Cylindrical vs. Prismatic Cells: Life, Safety, Cost◊◊◊опр *Greg Albright, Director, All Cell Technologies*	**11:00 Flexible Lithium-Ion Batteries for Practical Applications** *Moon-Seok Kwon, MSc, Principal Researcher, Energy Lab, Samsung Advanced Institute of Technology (SAIT), Samsung Electronics◊◊◊рлу*
11:30 New-Generation Cathodes and Anodes: Understanding What Information Determines Viability for Use in Large-Scale Applications◊◊◊отм *David Mackay, New-Generation Anode Engineer, Material Science and Engineering, Washington State University*	**11:30 Harnessing Your Biochemical Potential: Epidermal and Transdermal Biofuel Cells for Low-Power Wearable Applications◊◊◊bк!** *Joshua R. Windmiller, Ph.D., CTO and Founder, Bioliną, Inc.*
12:00 pm Enjoy Lunch on Your Own	

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Wednesday, April 20

SYMPOSIUM 1: LITHIUM BATTERIES FOR LARGE-SCALE APPLICATIONS	SYMPOSIUM 2: FLEXIBLE BATTERIES
APPLICATIONS TO MARKET	**NEXT-GENERATION CHEMISTRIES AND BATTERY DESIGN**
1:30 Chairperson's Remarks *Greg Albright, Director, All Cell Technologies*	**1:30 Chairperson's Remarks** *Haleh Ardebili, Ph.D., Assistant Professor, Mechanical Engineering, University of Houston*
1:35 Market Analysis: Hot Spots for the Lithium-Ion Advantage *Greg Tremelling, Senior Manager, Electrical Engineer, NEC Corporation*	**1:35 High Performance and Flexible Supercapacitor Devices** *R.K. Gupta, Ph.D., Assistant Professor, Department of Chemistry, Pittsburg State University*
2:05 Nickel-Iron and Lithium-Iron Batteries for Residential Off-Grid and Grid Backup *Brandon Williams, CEO, Battery System Design, Iron Edison Battery Company*	**2:05 New Strategies for the Design and Fabrication of Flexible and High-Energy Supercapacitors** *Reza Rizvi, Ph.D., Research Associate, Department of Chemistry & Biochemistry, California NanoSystems Institute, University of California, Los Angeles*
2:35 Lithium Battery Safety Advancements for High-Discharge Industrial Applications - Design Improvements for Increased Safety in High-Power and High-Discharge Lithium Batteries *Brent Perry, Ph.D., CEO, C Rate Solutions*	**2:35 Flexible Thin-Film Battery based on Graphene-Oxide Embedded in Solid Polymer Electrolyte** *Haleh Ardebili, Ph.D., Assistant Professor, Mechanical Engineering, University of Houston*
3:05 Refreshment Break with Poster Viewing	
3:30 Siting and Sizing of Distributed Battery Energy Storage in Electrical Grids *Hrvoje Pandzic, Ph.D., Assistant Professor, Department of Power & Energy Systems, University of Zagreb*	**3:30 Edge-Oriented Multilayer Graphene and Supported Oxide Nanosheets for Ultrafast Supercapacitors and High-Performance Batteries** *Zhaoyang Fan, Ph.D., Associate Professor, Electrical and Computer Engineering, Texas Tech University*
	4:00 Session Break
4:10 JOINT PANEL DISCUSSION: Overcoming the Barriers for Commercialization for Next-Generation Lithium Battery Applications *Moderator:* *Brittany Westlake, Ph.D., Engineer Scientist, Electric Power Research Institute (EPRI)* *Panelists:* *Thorsten Grün, Research Scientist, Competence-E, Karlsruhe Institute of Technology* *Erik Steeb, Vice President, Programs, Los Angeles Cleantech Incubator (LACI)* *Greg Tremelling, Senior Manager, Electrical Engineer, NEC Corporation* *Brandon Williams, CEO, Battery System Design, Iron Edison Battery Company*	
5:00 Close of Symposium	