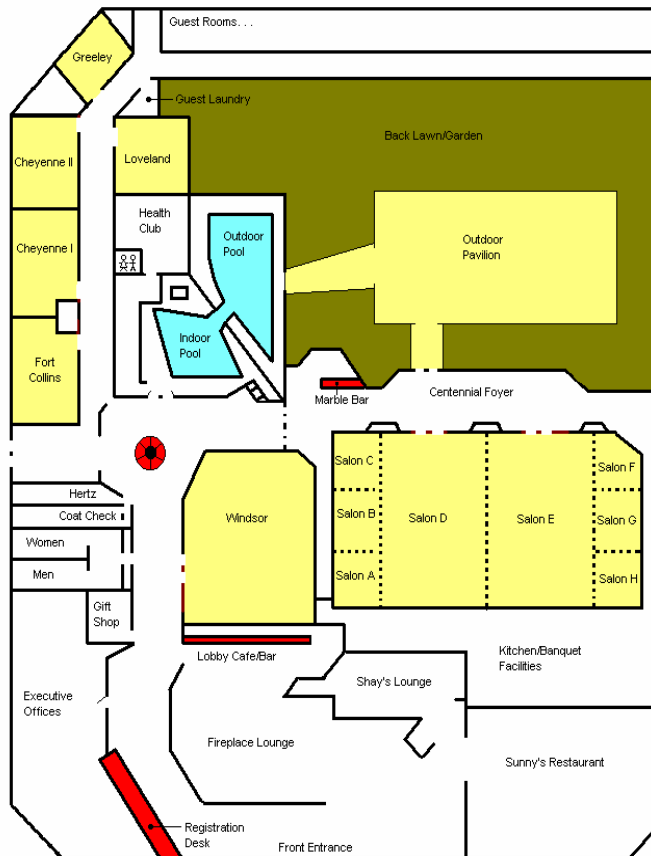


**Please see
inside front cover for
Specific Events.**



First Floor Layout:
 = Available Meeting Space



**INTERNATIONAL
PYROTECHNICS
SEMINARS USA**
 IPSUSA Seminars, Inc.



and

**THE INTERNATIONAL
PYROTECHNICS
SOCIETY**



*35th International
Pyrotechnics Seminar
and the
40th Anniversary
of the
IPS Seminar Series!*

PROGRAM



July 13th - 18th, 2008 (Sunday - Friday)
 Fort Collins Marriott Hotel
 Fort Collins, Colorado, USA

Seminar Co-Chairs

Mr. Larry L. Brown

(Applied Research Associates, Inc.)

Dr. Bernie Douda

(Crane Division - Naval Surface Warfare Center)

PROGRAM

Thirty-Fifth International Pyrotechnics Seminar
Fort Collins Marriott Hotel, Fort Collins, Colorado USA
July 13th – 18th, 2008 (Sunday – Friday)

The Week in Review:

Sunday, July 13th:

Registration begins at 4:00 P.M. to 7:00 P.M. in Salon C.
Reception will be held from 6:00 P.M. to 8:00 P.M. in the outdoor Pavilion.

General Information:

Poster setup will be held in the Windsor Room.
Registration will continue Monday – Friday from 7:30 A.M. to 5:00 P.M. in Salon C. (exception: Starts 7:00 A.M. on Monday)
All Continental Breakfasts will be served from 6:30 A.M. to 8:00 A.M. outside, in the Pavilion.
General Sessions, all starting at 8:20 A.M., will be held in Salons D, E, F, G and H. (exception: starts at 9:00 A.M. on Monday and starts at 8:00 A.M. on Wednesday)
All Lunches will be served from 12:00 P.M. to 1:30 P.M. outside, in the Pavilion.
All Breaks will be served in the foyer north of Salons D and E.

Monday, July 14th:

Lunch, will be outside, in the Pavilion at noon, except for the Session Chairs and BOD (by invitation only) which will be held in the Fort Collins Room.
Bursary Award presentation at 1:30 P.M. in the General Session.
Picnic Mixer will be held at 6:00 P.M. in the outdoor Pavilion.

Tuesday, July 15th:

Companion Tour buses for the Butterfly Pavilion, Celestial Seasonings Tea and Leanin' Tree Museum tour will pick up at 9:00 A.M. on the northeast side of the hotel.
Group Photo session outside on north side of hotel at 11:30 A.M.
Poster Session, attended by the authors, will be held from 4:00 P.M. to 5:00 P.M. in the Windsor Room.

Wednesday, July 16th:

Free day after noon, no lunch provided.

Thursday, July 17th:

International Pyrotechnics Society Business Meeting at 4:00 P.M. to 5:00 P.M. IPS members and non-members are encouraged to attend.
Buses leave at 5:30 P.M. from the northeast side of the hotel for the Terry Bison Ranch tour and dinner. *Dress is casual!*

Friday, July 18th:

35th International Pyrotechnics Seminar will adjourn at noon.
There will be a Wine and Cheese Farewell Social at 12:15 P.M. (everyone is welcome) in the outdoor Pavilion.

Please see back cover for map of the hotel.

Friday, 7/18/2008

Session H: SENSITIVITY, SAFETY, and IM

Session Chairs: Mr. Guy MARLAIR and
Dr. Stanley Caulder

- 8:20 H-1 007 *Probit Analysis of Friction Sensitivity of Explosives*
Sek K. Chan (Canada)
- 8:40 H-2 050 *The Effect of Processing Parameters on Ignition Characteristics and ESD Sensitivity of Nanothermites*
Chris J. Bulian, Jan A. Puszynski,
Jacek J. Swiatkiewicz (USA)
- 9:00 H-3 039 *Safety in Explosive and Pyrotechnic Manufacture*
N. V. Srinivasa Rao (India)
- 9:20 H-4 058 *Insensitive Pyrotechnic Ammunition*
Ernst-Christian Koch (Belgium)
- 9:40 H-5 012 *Insensitive Gun Propellants with Low Temperature Coefficient Based on DNDA*
Dietmar Mueller (Germany)

Break 10:00-10:30

Session H (cont.): POTPOURRI

- 10:30 H-6 010 *Imaging Different Nitrocellulose Grades by Scanning Probe Microscopy*
Denis SPITZER, N. PIAZZON,
M.R. SCHAFFER, V. PICHOT, M. COMET
(France)
- 10:50 H-7 005 *Novel Understanding of the Phenomenon of Negative Erosion and Existential Instability of the Physical Fields in the Burning Wave of the Energetic Materials*
Alexander N. Lukin (Russia)
- 11:10 H-8 075 *Flash Powder Electrostatic Ignition and Propagation*
C. J. Dahn, Abdollah Kashani,
Jerry Gribbins, Andrew Kusmierz,
Bernadette N. Reyes (USA)
- 11:30 H-9 **Adjourn the 35th International Pyrotechnics Seminar**
Co-Chairmen
- 12:15 **Wine and Cheese Farewell Social:**
Everyone is welcome!

- 11:30 F-9 046 *Atomization Characteristics of Energetic Liquid Film by Pulse Laser Reflection at Inclined Surface of High Refractive Index Material*
Takashi Kajiwara, Takashi Nishiyama,
Kunihito Nagayama, Shiro Kubota,
Motonoao Nakahara (Japan)

Lunch 12:00-1:30

Session G: AGING and TOXICITY

Session Chairs: Mr. C. James Dahn and
Prof. Yurii Frolov

- 1:30 G-1 074 *Lifetime Study on the Pyrotechnic Parts of a Munitions Article*
Wim de Klerk, Beat Berger,
Paul van Ekeren (Netherlands, Switzerland)
- 1:50 G-2 066 *Accelerated Aging of the M206 Countermeasure IR Flare*
Eric R. Bixon, Russell Broad, June DeSalvio,
Frank Gagliardi, Amita Nagori, Jay Poret,
Andrew Zimmer (USA)
- 2:10 G-3 059 *An Investigation into the Chemistry of Propellant Stabilizers and Ballistic Modifiers during Aging of Nitrocellulose/Nitroglycerine*
Mohammad H. Sammour (Egypt)
- 2:30 G-4 037 *A Historical and Contemporary Comparison of Frankford Arsenal Formula 675 and ATK's P₄primertm, Red Phosphorus Fueled Primers for Small Arms Cartridges*
Randall Busky, Lucas R. Lopez,
Paul J. Conroy (USA)
- 2:50 G-5 035 *Elimination of Perchlorate Oxidizers from Pyrotechnic Red Signal Flare Compositions*
Robert G. Shortridge, Christina M. Yamamoto (USA)
- 3:10 G-6 027 *Evaluation of Candidate Low Toxicity Colored Smoke Dyes*
Giancarlo Diviacchi, Joseph A. Domanico (USA)

Break 3:30-4:00

**4:00-5:00 International Pyrotechnics Society
Business Meeting
Award of Frank Carver Bursary
award certificate**

IPS members and non-members (Everybody)
are encouraged to attend

5:30 Buses leave for Terry Bison Ranch

Monday, 7/14/2008

9:00 **Welcome:**
Mr. Larry Brown and Dr. Bernie Douda,
Co-Chairs

Session A: GENERAL PYROTECHNICS

Session Chairs: Ms. Sandra Goldthorp and
Mr. James Wejsa

- 9:20 A-1 021 *Modeling of Pyrotechnic Combustion*
Trevor T. Griffiths (UK)
- 9:40 A-2 015 *Pyrotechnic Self-Assembly (PSA) Manufacture Process using Fluidized Bed UV Coating Technology*
Gary Chen, Mark Motyka, Wan Chen (USA)

Break 10:00 -10:30

- 10:30 A-3 022 *Inorganic Barrier Coating for the Protection of Magnesium Powder Against Humidity-Based Aging*
Todd J. Gudgel (USA)
- 10:50 A-4 013 *Combustion Performance of Coated Magnesium*
Caroline K. Wilharm (USA)
- 11:10 A-5 064 *Ageing of Magnesium Coated with Viton*
James Callaway, Nigel Davies (UK)
- 11:30 A-6 048 *European Directive 2007/23/EC on the Placing on the Market of Pyrotechnical Articles: Are You Concerned?*
Lionel AUFAUVRE (France)

Lunch 12:00-1:30

**1:30-2:00 B-0 Frank Carver Bursary Award Winner
Introduction by Mr. Al Munger,
President of the International Pyrotechnics Society**

Nano-Aluminum Powder Doped with Barium: Chemical States of Ba and Al Studied by X-Ray Photoelectron Spectroscopy

Konstantin Monogarov³,

Alla Pivkina¹, Elena Skryleva², Yu. Frolov¹

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²Moscow Steel and Alloys Institute, Leninsky pr. 4,
119049, Moscow, Russia

³Moscow Engineering Physics Institute (State University),
115409 Kashirskoe shosse 31, Moscow, Russia

Session B: SMOKE and BINDERS

Session Chairs: Dr. Trevor Griffiths and
Mr. David Turner

- 2:00 B-1 026 *Using a Standard Test Protocol to Qualify Candidate Low Toxicity Colored Smoke Dyes*
Joseph A. Domanico (USA)
- 2:20 B-2 028 *Characterization of Magnesium Carbonate for use in Pyrotechnic Smoke Compositions as Thermal Regulator*
Gary Chen, Christopher Fish (USA)
- 2:40 B-3 045 *Nonlethal 40 mm Flash Bang-Devices with Fuel-Rich Flash Powders*
R. H. Newell, L. S. Liu, R. J. Blau, P. C. Cannon,
N. L. Grossman (USA)

Break 3:00-3:30

- 3:30 B-4 054 *Assessment of Organic Fuels for Use in Environmentally Benign Colored Smoke Formulations*
Gretel Raibeck, Gary Chen (USA)
- 3:50 B-5 040 *Preliminary Results of an Investigation into the Use of Polymeric Binders in Pyrotechnics (PBP)*
M. G. Morgan, R. A. Pietrobon, M. B. Stringer,
A. Provas (Australia)
- 4:10 B-6 051 *Precursor Studies of Energetic Binders for High Energy Pyrotechnic Compositions*
Robert P. Claridge, T. A. Vine (UK)
- 4:30 B-7 073 *Studies on Fluoro Polymer Based Compositions for Advanced IR Flares*
R. S. Palaiah, V. P. Ambekar, D. K. Jawale,
M. J. Kohadkar, K. C. Raha, Amarjit Singh
(India)
- 4:50 B-8 069 *Versatility of Novel Low Viscosity Thermoset Binder in Pressed and Cast Illuminant Applications*
Heather M. Peterson, Dan B. Nielson,
Curtis W. Fielding, Richard L. Tanner (USA)

6:00 PM Casual Mixer at

Fort Collins Marriott Hotel

Everyone is invited; including children, friends, etc.

Thursday, 7/17/2008

Session F: COMBUSTION CHARACTERISTICS

Session Chairs: Prof. Kunihito NAGAYAMA and
Dr. Woodward Waesche

- 8:20 F-1 089 *Investigating Potential Sources of Environmental Perchlorate Contamination*
J. C. Oxley, J. L. Smith, J. Moran, C. Higgins,
P. Bowden (USA)
- 8:40 F-2 017 *Crack Behavior in Solid Propellant Grain as a Function of Ignition Pressure Gradient*
A. Shtark, N. Haron, J. Kanelbaum (Israel)
- 9:00 F-3 083 *Prediction of Usetime of Three Differently Stabilized Propellants*
Manfred A. Bohn, Peter Gerber (Germany)
- 9:20 F-4 032 *Minimum Pressure for Sustained Combustion in AN-based Emulsions*
Sandra Goldthorp, R. Turcotte, C. M. Badeen,
S. K. Chan (Canada)
- 9:40 F-5 042 *Burning Characteristics of Guanidium 1,5'-bis-1 H-Tetrazolate/Metal Oxide Mixtures as Candidate Gas Generating Agent*
Shingo DATE, T. Sugiyama, N. Itadzu,
Y. Miyata, M. Abe, K. Hasue (Japan)

Break 10:00-10:30

- 10:30 F-6 062 *Unusual Behaviors of Low Temperature Silver Nitrate/Molybdenum Based Autoignition Materials*
Christian W. Salafia, Scott D. Hall,
Gregory D. Knowlton (USA)
- 10:50 F-7 049 *Effects of CuO, Cu, and MnO₂ on Combustion of Ammonium Nitrate/Aminoguanidium 5,5'-azobis-1 H-tetrazolate Mixtures*
Yasuyoshi Miyata, Masahiro Abe, Shingo Date,
Makoto Kohga, Kazuo Hasue (Japan)
- 11:10 F-8 055 *Combustion Characteristics of Reactive Thin Film Ignited by Pulse Laser Ablation*
Yuji Utsunomiya, Akihiro Toyoda,
Takashi Kajiwara, Takashi Nishiyama,
Kunihito Nagayama, Shiro Kubota,
Yoshinori Yamada, Yoshiaki Mitarai (Japan)

Wednesday, 7/16/2008

Session E: PYROTECHNICS RELATED

Session Chairs: Ing. Wim de Klerk and
Dr. Greg Knowlton

- 8:10 E-1 019 *Potassium Dinitramide as a Pyrotechnic Oxidant for Red Flare Applications*
Trevor T. Griffiths (UK)
- 8:30 E-2 053 *Demonstration of an Environmentally Benign Pyrotechnic Black Smoke in a Battlefield Effects Simulator*
Gretel Raibeck, Gary Chen,
Catherine Kislowski (USA)
- 8:50 E-3 052 *Product Improvements on the Thermate Incendiary Grenade*
Gary Chen, Jessica Horning (USA)
- 9:10 E-4 020 *New Pyrotechnic Compositions for Incendiary Ammunition Applications*
Trevor T. Griffiths, E L Charsley, J J Rooney,
H M Markham (UK)
- 9:30 E-5 016 *Non-Isothermal Kinetics of Fast High-Temperature Reactions in Condensed energetic Materials*
Alexander S. Shteinberg, A. A. Berlin (Russian)

Break 10:00-10:30

Session E (cont.): KINETICS & THERMAL ANALYSIS

- 10:30 E-6 060 *Methods of Computational Chemistry in Structure-Properties Relationships of Energetic Materials*
Tatyana S. Pivina, M. S. Molchanova, V. L. Korolev, A. A. Porollo, Yu. N. Matyushin,
V. P. Ivshin (Russia)
- 10:50 E-7 043 *Application of Advanced Kinetics to HFC Signals for the Life-time Prediction of Energetic Materials*
Bertrand Roduit, P. Guillaume, S. Wilker,
P. Folly, A. Sarbach, B. Berger, J. Mathieu,
M. Ramin, B. Vogelsanger (Switzerland)
- 11:10 E-8 063 *Detonation Calorimeter Characterization of Selected Explosive Compositions*
Scott D. Hall, Andrew R. Davis,
Gregory D. Knowlton (USA)
- 11:30 E-9 065 *Thermal Studies on Rubidium Dinitramide*
Beat Berger, E. L. Charsley, T. T. Griffiths,
P. G. Laye, H. M. Markham, J. J. Rooney,
M. P. Wasko (Switzerland, UK)

**Note: Wednesday afternoon is free time.
No lunch provided.**

Tuesday, 7/15/2008

Session C: NANO and SMALL SIZE TECHNOLOGY

Session Chairs: Dr. Denis SPITZER and
Prof. Jan Puszynski

- 8:30 C-1 071 *Influence of Nano-sized Components on Ballistic Properties of Heterogeneous Condensed Systems*
Yurii Frolov (Russia)
- 8:50 C-2 057 *Characterization of Reactive Multilayer Ti/B Films*
Alexander S. Tappan, Joel P. McDonald,
David P. Adams, Eric D. Jones, Jr.,
Frank M. Horine (USA)
- 9:10 C-3 008 *Impressive Change of Reactive Properties of High Explosives Structured and Stabilized at Nano-Scale in an Inert Porous Matrix*
Marc COMET, Benny SIEGERT,
Vincent PICHOT, Denis SPITZER,
Nelly PIAZZON, Pierre GIBOT (France)
- 9:30 C-4 038 *Nanothermites with Condensable Gas Products*
Curtis Johnson, Kelvin Higa, Rick Albro (USA)

Break 9:50-10:30

- 10:30 C-5 056 *Investigations into MEMS Scale Detonators*
Robert P. Claridge, T. A. Vine, A. J. Leggett (UK)
- 10:50 C-6 034 *Microenergetics: Characterization of Sub-Millimeter PETN Films*
Ryan R. Wixom, Alexander S. Tappan,
Gregory T. Long, Anita M. Renlund,
Eric J. Welle, Joel P. McDonald,
Bradley H. Jared, Aaron L. Brundage,
Joseph R. Michael (USA)
- 11:10 C-7 070 *Lead Azide Reactions at Sub-Millimeter Diameters*
Peter C. Jung, Alexander S. Tappan,
Eric J. Welle, and Stephen K. Marley (USA)

11:30 GROUP PHOTO

Lunch 12:00-1:40

Session D: EXPLOSIVES RELATED

Session Chairs: Dr. Dietmar Mueller and
Mr. Alexander Tappan

- 1:40 D-1 080 *Extending the Use of the Fire Propagation Apparatus to Qualify Burning Scenarios of Energetic Materials and Oxidative Properties of Chemicals*
Guy Marlair, Hubert Biteau, Ruddy Branka, Jose Torero (France and UK)
- 2:00 D-2 024 *Probabilistic "Limited Hot Spot" Detonation Model of Ammonium Nitrate Based Explosives*
Alexander Yu. Reshetnyak (Russia)
- 2:20 D-3 029 *Effect of Particle Size on Detonation of Packed Bed of Aluminum Particles Saturated with Nitromethane*
Yukio Kato, Kenji Murata, Eiji Yano, Shinichi Matsuzaki, Yoshimasa Suzuki (Japan)
- 2:40 D-4 031 *Effects of Cylindrical Shape of Charge to the Results of Energy Measurements of Explosives*
Martti Hagfors (Finland)
- 3:00 D-5 044 *Novel Synthesis of 3,3-Diaminoazoxyfurazan (DAAF) and a Survey of Performance Testing and Characterization*
Elizabeth Francois, David Chavez, Bryce Tappan, V. Eric Sanders (USA)

Break 3:20-4:00

4:00 – 5:00 POSTERS: *Posters will be attended by the authors.*

- P-1 *Thermal Parameters of the Burning Wave for Barium Nitrate/Magnesium/Organic Additive Pyrotechnic Mixtures*
Varyonykh N.M., Obeziyaev N.V., Sheludyak Yu. E. (Russia)
- P-2 *Selected Observations on the Combustion of Charcoal Briquets Utilized for the Outdoor Preparation of Food IX*
James L. Austing (USA)
- P-3 *Underwater Explosions: Effects of Cylindrical Shape of Charge to the Results of Energy Measurements of Explosive*
Martti Hagfors (Finland)
- P-4 *Fire Test on Fireworks Storage Container*
M. K. Hihkio, M. J. Ojala (Finland)
- P-5 *Environmental Assessment of Pyrotechnic Combustion Products*
Paul D. Howe, Stuart Dobson, Heath M. Malcolm, Trevor T. Griffiths (UK)
- P-6 *The Impact Endurance of Hot Bridge Wire Type K13 Electric Detonator*
Ki Geun Song, Moon Ho Lee, Jin Rai Cho (S. Korea)

- P-7 *Developing a Technology Roadmap for Cartridges, Cartridge Actuated Devices and Propellant Actuated Devices in Aircraft Systems*
F. J. Valenta (USA)
- P-8 *Development of Pyrotechnically Releasable Mechanical Linking Device*
YeungJo Lee, DongJin Kim (S. Korea)
- P-9 *Ecoregion Approach for Development of the Integrated Marine Area Space in Decentralization Era (Towards Sustainable Marine Area Development)*
Dian Prihadyanti, Prakoso Bhairawa Putera S. (India)
- P-10 *Premature Explosion of an Oil Well Simulation Test*
C. James Dahn (USA)
- P-11 *New Morphology of Composite Powders*
X.H.Xie, H.S.Zhou, S.L.Yan, W.Y.Huang, M Wang, H Liu (China)
- P-12 *MSDS Autoignition Temperature and Fire Hazard*
Abdollah Kashani, C. James Dahn (USA)
- P-13 *Synthesis, Combustion Regularities and Impact Sensitivities of Hydrazinnitramines Salts and Their Mixtures with Ammonium Perchlorate*
N.F. Pyatakov, I.B. Vyunova, S.S. Novikov (Russia)
- P-14 *Quantitative Structure-Property Relationship Studies for Predicting Explosibility of Nitroaromatic Compounds*
G. Fayet, P. Rotureau, L. Joubert, C. Adamo (France)
- P-15 *The Effect of Burning Rate Catalysts on Composite Propellants Containing Nanosized Aluminum*
Abraham Shalom, Hadassah Aped, Moshe Kivity (Israel)
- P-16 *Magnesium / Xenon (II) Flouride (MAX) - A New High Energy Density Material*
Ernst-Christian Koch, Volker Weiser, Evelin Roth, Stefan Kelzenberg (Belgium)
- P-17 *Combustion Characteristics of Condensed-Phase Reactions in Sub-millimeter Geometries*
Lori J. Groven, Jan A. Puszynski, Alexander S. Tappan (USA)
- P-18 *Evaluation of Encapsulated Red Phosphorus in Marine Signal Munitions*
Dr. Peter Jemmett, Kavin Patel, Jim Callaway (UK)
- P-19 *A Very Efficient Pyrotechnic Aerosol Flame Suppressant*
Phil Posson (USA)
- P-20 *HDRI Photo-real Procedural Modeling and Animation of Combustion Mechanisms*
Mark J. Prusten (USA)