Fraunhofer ICT

Program

Artificial Intelligence, Machine Learning and Data Science in Energetic Materials Research

54th International Annual Conference of the Fraunhofer ICT
combined with
Symposium "Advances in Metal Fuels and Reactive Materials Science and Technology"

June 24-27, 2025
Convention Center, Gartenhalle
Karlsruhe, Germany

Introduction

The Fraunhofer ICT International Annual Conference serves as a forum to discuss the current state of the art, to present new methods, ideas, and research results and to further improve scientific understanding in the field of energetic materials. Join our conference to benefit from a platform for lively discussions, detailed exchange of scientific results and – most importantly – for networking with international experts.

Up to this day, even after decades of research and progress, the development of new energetic materials and systems still relies heavily on cost- and time-consuming trial and error. The reason for this is that the characteristics of energetic materials, such as performance, sensitivity or aging, often exhibit unexpected and very sensitive dependencies on changing environmental conditions like temperature, pressure, or chemical composition. Also, the identification of essential input parameters for established numerical simulations is often constrained by challenging experimental conditions or financial and temporal limitations which restrict the detailed characterization to only a few selected candidate materials.

New methods in the fields of artificial intelligence, machine learning and data science could revolutionize the development of new energetic materials and systems in the future. This would enable scientists to screen larger chemical spaces and a wider range of life-cycle conditions and applications than ever before, to learn about cause-effect relationships and to extract more information from datasets. However, there is a caveat. One of the main challenges is the often limited size and quality of datasets, which hinders the development of precise models and the ability to discriminate between real information and statistical noise.

The 54th International Annual Conference of Fraunhofer ICT gives energetic materials researchers a unique opportunity to discuss new methods and trends, to meet old and new colleagues and to contribute to a lively discussion. In particular, the conference offers a unique platform for young scientists and early-career researchers to present their research and to build their international network of experts.

The integration of "Advances in metal fuels and reactive materials science and technology" – a symposium organized by Dr. Carole Rossi (Toulouse/F), Dylan J. Kline (Livermore, CA/USA), Conrad J. M. Hessels (Eindhoven/NL) and Peter Schaaf (Ilmenau/D) – into the 2025 Fraunhofer ICT International Annual Conference will contribute further to its wide spectrum of scientific contributions.

Chairman of the Conference
Dr. Sebastian Wurster
Spokesman for Explosives Technology, Safety and Security
Fraunhofer ICT, Pfinztal, Germany

General Information

Registration

- Register online: www.ict.fraunhofer.de/annualConference
- Registration fee (incl. proceedings, coffee breaks, lunch): **€ 950,--**
- Participation cannot be guaranteed for registrations arriving after June 16th, 2025. The fee has to be paid **upon receipt of the invoice** by bank transfer.

Cancellation Policy

- **€ 500,--** will be charged for cancellations after June 17th, 2025. **No-shows** will be charged the whole fee.

Accommodation

- Online, see www.ict.fraunhofer.de/annualConference

Conference Office

- Foyer of the GARTENHALLE
- Open from Tuesday, June 24, 16.00 h till Friday, June 27, 14.00 h **during the Conferenc**e and may be reached by Phone +49-(0)7 21 / 37 20 - 6000

Check in / Welcome Reception

- Please check in at the Conference Office on **Tuesday, June 24, between 16.00 and 20.00 h**.
- All participants are cordially invited to the **Welcome Reception** on the same day, starting at **18.00 h** in the foyer of the GARTENHALLE.

Conference Language

- English

Get-together (Thursday, June 26)

- The Fraunhofer ICT can be visited on **Thursday, June 26** in the evening. There will be a **Get-together Party** with draught beer, barbecue and fireworks (after sunset). Please **mark on your registration form** whether you wish to participate.
- Transportation: Bus shuttle Convention Centre Karlsruhe – Fraunhofer ICT and back

Chairman

- Dr. Sebastian Wurster (Fraunhofer ICT)

Program Committee

- Richard Gee (Lawrence Livermore National Laboratory, USA)
- Thomas M. Klapötke (LMU München, D)
- Dylan J. Kline (Lawrence Livermore National Laboratory, USA)
- Ernst-Christian Koch (Lutradyn, D)
- Henric Oestmark (FOI, SE)
- Jiri Pachman (University of Pardubice, CZ)
- Carole Rossi (LAAS-CNRS, F)

Exhibiting companies

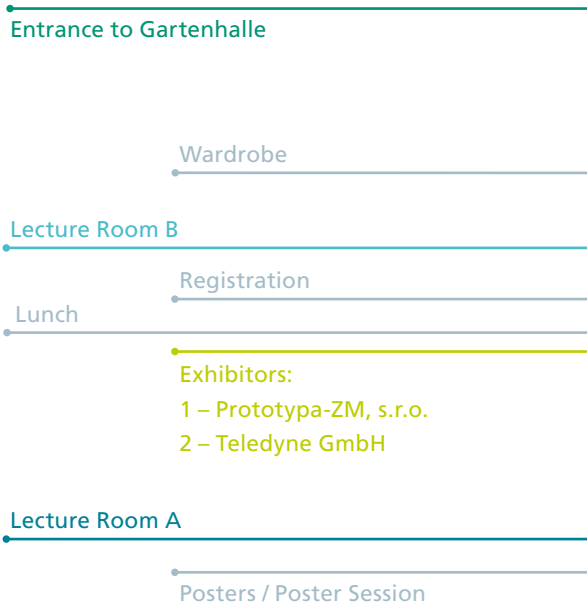
- Prototypa-ZM, s.r.o., Brno, CZ
- Teledyne GmbH, Heidelberg, D

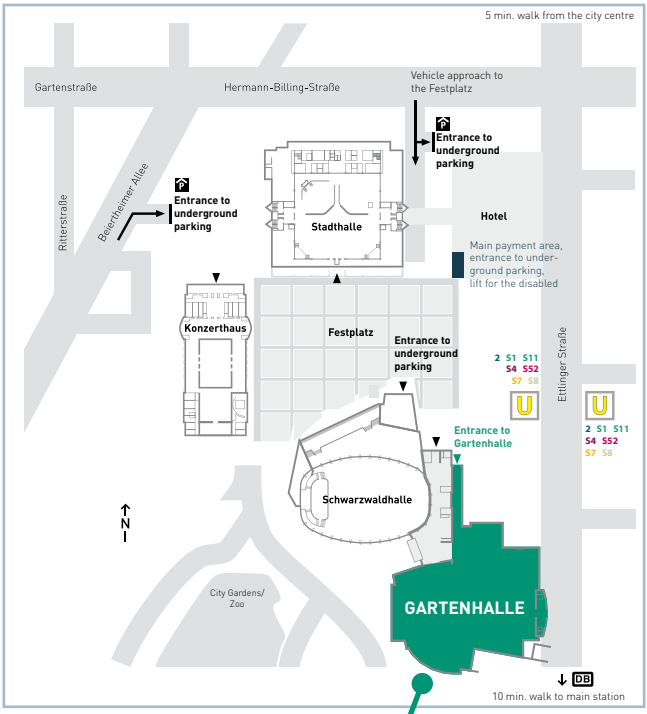
How to find the venue

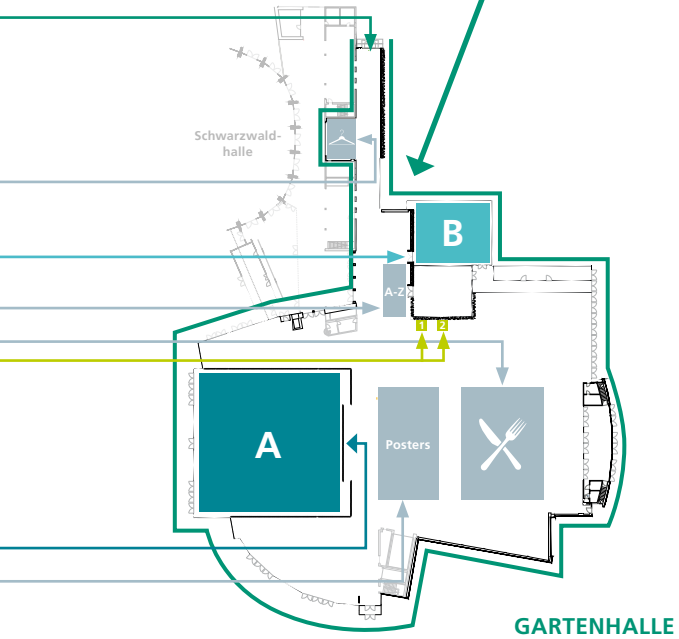
Karlsruhe is located 120 km south of Frankfurt (Main)/Frankfurt International Airport just beside the Autobahn A5, and is also connected to Frankfurt via the Intercity Express Train ICE. Additional airports are: Strasbourg (F) (approx. 100 km) and Stuttgart (D) (approx. 90 km).

By car: Coming from the A5/A8, please take exit no. 45 "Karlsruhe-Mitte" in the direction of Karlsruhe. Leave the B10 in the direction of "Stadtmitte/Zentrum". Coming from the A 65/ or B10, please take exit no. 2 in the direction of "Kongresszentrum". Follow the signs for "Kongresszentrum".

Address:
Congress Center Karlsruhe, Festplatz 9, 76137 Karlsruhe, Germany




5 min. walk from the city centre
Gartenstraße
Hermann-Billing-Straße
Vehicle approach to the Festplatz
Entrance to underground parking
Entrance to underground parking
Rittersstraße
Beerheimer Allee
Stadthalle
Hotel
Main payment area, entrance to underground parking, lift for the disabled
Konzerthaus
Festplatz
Entrance to underground parking
2 S1 S11 S4 S52 S7 S8
Ettlinger-Straße
Entrance to Gartenhalle
Schwarzwaldhalle
N
City Gardens/ Zoo
GARTENHALLE
10 min. walk to main station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Posters
GARTENHALLE

Tuesday, June 24

16.00-20.00		**Check-in**
18.00-20.30		**Welcome Reception**

Wednesday, June 25

LECTURE ROOM A

09.00 **WELCOME AND OPENING**
S. Wurster
Fraunhofer ICT, Pfinztal, D
S. Wilker
BAAINBw, Koblenz, D

KEYNOTE-SESSION I
Chair: S. Wurster, Fraunhofer ICT

09.20	A1	**KEYNOTE I – FEAST OR FAMINE? AN EXPERIMENTALISTS VIEW OF ARTIFICIAL INTELLIGENCE TO ENERGETICS RESEARCH** A. Mueller Los Alamos National Laboratory, USA
09.50	A2	**KEYNOTE II – PROGRESS IN INTERTWINING ARTIFICIAL INTELLIGENCE WITH HIGH FIDELITY MODELING TO ENHANCE MULTI-SCALE, MULTI-PHYSICS SIMULATIONS** H. S. Udaykumar University of Iowa, USA
10.20		**Coffee break**

LECTURE ROOM B

LECTURE ROOM A

SESSION A1

TOWARDS AN UNDERSTANDING OF SENSITIVITY OF ENERGETIC MATERIALS USING AI/ML

Chair: W. de Klerk, TNO, NL

11.00 **A3** **UTILIZING LARGE DATASETS OF EXPLOSIVES TO INTERPRET HANDLING SENSITIVITY TRENDS**
V. W. Manner, M. J. Cawkwell, J. V. Davis, F. W. Marrs, N. Lease
Los Alamos National Laboratory, USA

11.20 **A4** **PREDICTING DROP-WEIGHT IMPACT SENSITIVITY DIRECTLY FROM MOLECULAR STRUCTURE USING PHYSICS-INFORMED MACHINE LEARNING**
E. C. Thompson, G. Hutchings, F. W. Marrs
Los Alamos National Laboratory, USA

11.40 **A5** **MISCONCEPTIONS AND OPEN ISSUES IN ENERGETIC MATERIALS**
D. Mathieu
CEA DAM, Monts, F

12.00 **A6** **AN IMPROVED STATISTICAL ANALYSIS OF 80 SENSITIVITY DATASETS**
D. Christensen, G. P. Novik
FFI, NO
A. van der Heijden
TNO, NL

12.20 **A7** **PREDICTING THE SENSITIVITY OF ENERGETIC COMPOUNDS THROUGH MACHINE LEARNING: FOR DISCOVERING INSENSITIVE ENERGETIC MATERIALS**
Yu-Cong Chen, Wenbin Yi
School of Chemical Engineering NJUST, Nanjing, PRC

12.40 **Lunch break**

LECTURE ROOM B

SESSION B1

PROCESSING OF BI-FUELS AND ADVANCED REACTIVE MATERIALS FOR ENHANCED PERFORMANCE

Chair: A. Esteve, LAAS-CNRS University of Toulouse, F

B1 **TUNING AND AUTOMATED CHARACTERIZATION OF NANOSTRUCTURAL METAL COMPOSITES FOR COMBUSTION APPLICATIONS**
K.-L. A. Chintersingh
New Jersey Institute of Technology, USA

B2 **SYNTHESIS OF COLLOID ENERGETIC PARTICLES AND THEIR UNDERWATER COMBUSTION BEHAVIORS**
J. Z. Wen
University of Waterloo, CAN

B3 **COMBUSTION CHARACTERISTICS OF FE/CUO PYROTECHNIC COMPOSITIONS**
N. Mokrani, S. Bernard, L. Courty
Universite Orleans, Bourges Cedex, F

B4 **TITANIUM-BASED NANOTHERMITES AND NSTEXS**
T. Jarosz, A. Stolarczyk
Silesian University of Technology, Gliwice, PL
M. Polis, K. Szydlo
Institute of Industrial Organic Chemistry, Krupski Mlyn, PL

B5 **TWO-DIMENSIONAL ENGINEERING OF METASTABLE INTERMOLECULAR COMPOSITES: SYNERGISTIC ENHANCEMENT OF MECHANICAL STRENGTH AND STIMULUS-SPECIFIC SENSITIVITY**
Jingwei Li, Xuwen Liu
Jianghan University, Wuhan / Nanjing University of Science and Technology, Nanjing, PRC
Yaqing Cao
Nanjing University of Science and Technology, PRC
Guangyu Yin, Zhangbo Ming, Zhichao Zhao, Yihao Shen
Jianghan University, Wuhan, PRC

LECTURE ROOM A

SESSION A2

MODELING AND SIMULATION OF TRANSIENT ENERGETIC MATERIAL BEHAVIOR WITH AI/ML METHODS

Chair: S. Deng, MIT, USA

14.00 **A8** **BAYESIAN PARAMETRIC LATENT DYNAMICS MODELING OF SHOCK-INDUCED PORE COLLAPSE PROCESS**
S. W. Chung, Y. Choi, P. Tranquilli, C. M. Miller, H. Keo Springer, K. Sullivan
Lawrence Livermore National Laboratory, USA

14.20 **A9** **EMULATING ADAPTATIVE MESH REFINEMENT FOR ENERGETIC MATERIALS WITH DEFORMABLE PHYSICS AWARE RECURRENT CONVOLUTIONAL NETWORKS (D-PARC)**
J. T. Beerman, S. S. Baek
University of Virginia, Charlottesville, USA
P. K. Seshadri, Y.-T. Nguyen, H. S. Udaykumar
University of Iowa, Iowa City, USA

14.40 **A10** **REDUCED ORDER MODELING OF DYNAMICAL SYSTEMS OF ENERGETIC MATERIALS USING PHYSICS-AWARE CONVOLUTIONAL NEURAL NETWORKS IN A LATENT SPACE (LatentPARC)**
Z. J. Gray, S. Azarfar, S. S. Baek
University of Virginia, Charlottesville, USA
H. S. Udaykumar
University of Iowa, Iowa City, USA

15.00 **A11** **A PHYSICS-AWARE DEEP LEARNING MODEL FOR SHEAR BAND FORMATION IN WEAK SHOCK REGIME**
X. Cheng, B. Chen, J. Choi, S. Baek
University of Virginia, Charlottesville, USA
Y. T. Nguyen, P. Seshadri, M. Verma, H. S. Udaykumar
University of Iowa, Iowa City, USA

15.20 **Coffee break**

LECTURE ROOM B

SESSION B2

IN-SITU CHARACTERIZATION OF REACTION KINETICS

Chair: M. Abere, Sandia National Laboratories, Albuquerque, USA

B6 **WHAT ATOMIC PROPERTIES OF METAL OXIDE CONTROL THE INITIATION TEMPERATURE WITH METAL FUELS**
X. Wang
University of California, Irvine, USA

B7 **CHARACTERIZATION OF ULTRAFAST DECOMPOSITION DYNAMICS IN NITRATE ESTER ENERGETIC MATERIALS**
E. Britt, H. Lopez Pena, M. Minvielle, K. Moore Tibbetts
Virginia Commonwealth University, Richmond, USA

B8 **UNDERSTANDING AND CONTROLLING REACTIVITY IN THERMITES**
K. T. Sullivan
Lawrence Livermore National Laboratory, Livermore, USA

B9 **QUANTIFYING THE EFFECTS OF ARTIFICIAL AGING ON THE IGNITION AND REACTION OF NI/AL MULTILAYERS**
D. P. Adams, S. McPherson, H. Choi, P. G. Kotula, A. Jarzembski, K. Potter, P. E. Specht, M. J. Abere
Sandia National Laboratories, Albuquerque, USA
G. B. Kennedy, N. N. Thadani
Georgia Institute of Technology, Atlanta, USA

LECTURE ROOM A

SESSION A3

AI/ML – STRUCTURE, PROPERTY, PERFORMANCE RELATIONS AND MOLECULAR DESIGN PREDICTIONS I

Chair: E.C. Koch, Lutradyn, D

16.00 **A12** **IMPROVING THE ESTIMATION OF ENTHALPIES OF FORMATION OF ENERGETIC SALTS**
E. Ott, J. Glorian
ISL, Saint Louis, F
D. Mathieu
CEA DAM, Monts, F

16.20 **A13** **MACHINE LEARNING/ARTIFICIAL INTELLIGENCE BASED ENERGETIC MOLECULE DESIGN STRATEGY**
Wen Qian, Jian Liu, Chaoyang Zhang
Institute of Chemical Materials CAEP, Mianyang, PRC

16.40 **A14** **PREDICTING MOLECULAR PROPERTIES VIA INTERPRETABLE MACHINE LEARNING AND HIGH-THROUGHPUT COMPUTATIONS**
M. C. Davis, J. N. Schroeder, R. Seaton Ullberg, W. Kort-Kamp, C. J. Snyder, I. Matanovic
Los Alamos National Laboratory, USA

17.00 **A15** **SWITCH ON AMINE SUBSTRATE REACTIVITY TOWARDS HEXAAZAISOWURTZITANE CAGE: INSIGHTS FROM A TAILORED MACHINE LEARNING MODEL**
Lei Zhang, Chunlin He, Kaile Dou, Siping Pang
Beijing Institute of Technology, Beijing, PRC

17.20 **A16** **DATA- AND MECHANISM-DRIVEN EXPLAINABLE DEEP LEARNING RESEARCH ON ENERGETIC MATERIALS**
Xin Huang
Institute of Chemical Materials CAEP, Mianyang, PRC

LECTURE ROOM B

SESSION B3

IN-OPERANDO CHARACTERIZATION OF SELF-PROPAGATING REACTION

Chair: X. Mi, Eindhoven University of Technology, NL

B10 **ENGINEERING MICROSCALE AGGLOMERATION AND MACROSCALE REACTION PROPAGATION OF HIGH NANO-ALUMINUM LOADING ENERGETIC COMPOSITES**
H. Wang
Beijing University, Beijing, PRC
M. R. Zachariah
University of California, Riverside, USA

B11 tba

B12 **INVESTIGATING THE COMBUSTION MECHANISMS OF TIB2 INTEGRATED AL/CUO NANOTHERMITES THROUGH IN-OPERANDO FLAME CHARACTERIZATION**
V. Singh, A. Esteve, C. Rossi
LAAS-CNRS, University of Toulouse , F

B13 **EXTRACTING AND VALIDATING MECHANISMS FROM 3D SIMULATIONS OF SPIN-LIKE FLAMES IN CO/AL**
M. J. Abere, D. E. Kittell, C. Sobczak, D. P. Adams
Sandia National Laboratories, Albuquerque, USA
R. V. Reeves
Lawrence Livermore National Laboratory, USA

B14 **COMBUSTION OF LITHIUM AND MAGNESIUM FOR HEAT AND POWER GENERATION IN SPACE MISSIONS**
S. Cordova, K. Estala-Rodriguez, E. Shafirovich
The University of Texas, El Paso, USA

Thursday, June 26

LECTURE ROOM A

KEYNOTE SESSION II

Chair: S. Wurster, Fraunhofer ICT

09.00 **A17** **KEYNOTE III – MODEL CALIBRATION AND UNCERTAINTY QUANTIFICATION FOR REACTIVE MATERIALS**
S. Deng
Massachussets Institute of Technology, USA

09.30 **A18** **KEYNOTE IV – COMBINING MACHINE LEARNING AND PHYSICS: PREDICTIVE MODELS FOR PROCESSING, INITIATION, AND PERFORMANCE OF ENERGETICS**
A. Strachan
Purdue University, USA

10.00 **Coffee break**

SESSION A4
AI/ML- STRUCTURE, PROPERTY, PERFORMANCE RELATIONS AND MOLECULAR DESIGN II

Chair: S. Wilker, BAAINBw, D

10:40 **A19** **OPTIMISATION OF BATCH MIXING USING MACHINE CALCULATIONS SOFTWARE**
L. Esperi, E. Tunestal
Eurenco Bofors AB, Karlskoga, SE

11.00 **A20** **A RAPID COMPOSITE EXPLOSIVE FORMULATION METHOD INTEGRATING MULTI-OBJECTIVE OPTIMIZATION AND MACHINE LEARNING FOR DIVERSE APPLICATIONS**
Lijuan Peng, Yuxin Huang, Wenhua Zhu
Southwest University of Science and Technology, Mianyang, PRC
Donglei Wang, Xuwang Liu, Hengjian Huang
Institute of Chemical Materials CAEP, Mianyang, PRC

LECTURE ROOM B

SESSION B4

NUMERICAL MODELING FOR ANALYZING REACTION MECHANISMS AND OPTIMIZING THE PERFORMANCE OF REACTIVE MATERIALS

Chair: J. Wen, University of Waterloo, CAN

B15 **MESOSCALE MODELLING OF SHOCK INDUCED REACTIONS IN NI+AL MULITLAYER THIN FILMS**
D. E. Kittell, P. E. Specht, M. J. Abere, K. M. Potter, S. L. McPherson, D. P. Adams
Sandia National Laboratories, Albuquerque, USA

B16 **DEVELOPING DIFFERENTIABLE PHASE TRANSITION MODELS IN REACTIVE MATERIALS**
W. Schill
Lawrence Livermore National Laboratory, Livermore, USA

LECTURE ROOM A

11.20 **A21** **DEVELOPMENT OF A ML-DRIVEN SELF-OPTIMIZATION WORKFLOW FOR THE PRODUCTION OF NITROGEN-RICH COMPOUNDS IN CONTINUOUS PROCESSING**
G. Araya Vargas, D. Boskovic, M. Schwarzer, A. Mendl
Fraunhofer ICT, Pfinztal, D

11.40 **A22** **ACCELERATING MOLECULE DISCOVERY THROUGH INVERSE DESIGN**
C. J. Snyder, I. Matanovic, W. Kort-Kamp, J. V. Davis, C. Garcia Cardona, M.C. Davis, A. Salij, R. Seaton Ullberg, J. N. Schroeder, L. Stevens Ouellet, L. V. Hooker, M. J. Cawkwell, R. Perriot, M. E. Hamilton, D. E. Chavez, E. S. Rivera, P. M. Mach
Los Alamos National Laboratory, Los Alamos, USA

12.00 **A23** **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING FOR ENERGETICS: THE PROMISE AND THE PITFALLS**
R. M. Doherty
Energetics Technology Center, USA

12.20 **Lunch break**

POSTER SESSION

14.00 Poster Session (Foyer)

14.20 Poster Session (Foyer)

LECTURE ROOM B

B17 **ATOMIC SCALE MODELLING OF GAS/SURFACE AND SOLID/SOLID INTERFACIAL CHEMISTRY IN THE REACTION OF AL/CUO THERMITE**
A. Esteve, H. Jabraoui, C. Rossi
LAAS University of Toulouse, CNRS, F

B18 **MODELLING OF PYROTECHNIC MIXTURES**
S. Knapp
Fraunhofer ICT, Pfinztal, D

B19 **EXPERIMENTS AND MODELING OF THERMITE REACTIONS**
M. J. S. de Lemos
Instituto Tecnologico de Aeronautica (ITA),
Sao Jose do Campos, BR

Session B5

METAL COMBUSTION FOR SUSTAINABLE ENERGY APPLICATION (TERRESTRIAN AND SPACE APPLICATIONS) I

Chair: H. Wang, Beijing University, Beijing, PRC

B20 **ON THE COMBUSTION OF FE-AL AND FE-SI POWDERS FOR SUSTAINABLE ENERGY STORAGE**
L. Ahmad, Z. Bruyr, F. Contino, P. J. Jacques, L. Choisez
Universite Catholique de Louvain, B
Y. Li, A. Sperling, B. Böhm, A. Dreizler
Technical University of Darmstadt, D

B21 **ENHANCING IRON-POWDER COMBUSTOR PERFORMANCE THROUGH FUNDAMENTAL INSIGHTS**
X. Mi, W. Tian, S. Hemamalini, L. Thijs, K. Zhang,
N. van den Hout, Y. Shoshin, V. Kornilov,
G. Finotello, B. Cuenot, P. de Goey
Eindhoven University of Technology, Eindhoven, NL

LECTURE ROOM A

14.40 Poster Session (Foyer)

15.00 Poster Session (Foyer)

15.20 **Coffee break**

Session A5

AI/ML – STRUCTURE, PROPERTY, PERFORMANCE RELATIONS AND MOLECULAR DESIGN PREDICTIONS III

Chair: M. Heil, Fraunhofer ICT

16.00 **A24** **BUILDING ENERGETIC CHEMICAL SPACES**
C. Wespiser, D. Mathieu, M. Daniel, E. Pasquinet
CEA-DAM Le Ripault, Monts, F

16.20 **A25** **MODELING THE INITIATION OF THERMO-MECHANICS OF ENERGETIC MATERIALS WITH LEARNABLE ACTIVATION FUNCTIONS**
J. B. Choi, Y. Cheng, S. Azarfar, C. Williams, S. Baek
University of Virginia, Charlottesville, USA
Y. T. Nguyen, P. Seshadri, H. S. Udaykumar
University of Iowa, Iowa City, USA

17.30 **Bus Departure from Conference Hall to Fraunhofer ICT**

18.00 **Get-together**
Barbeque Party, offering wine, draught beer

22.30 **Fireworks**

LECTURE ROOM B

B22 **DIRECT NUMERICAL SIMULATION OF AN ALUMINUM PARTICLE COMBUSTION IN OXIDIZING FLOW, WITH GAS AND CONDENSED-PHASE REACTIONS**
L. Pillemont, A. Esteve, C. Rossi
LAAS-CNRS, University of Toulouse, F
B. Bedat, O. Simonin
IMFT, University of Toulouse, F

B23 **IRON AS CARBON-FREE ENERGY CARRIER IN A CIRCULAR ENERGY ECONOMY: CYCLING AT MILD CONDITIONS**
A. Knapp, F. Straub, C. Kuhn, O. Deutschmann
Karlsruhe Institute of Technology KIT, Karlsruhe, D

Session B6

METAL COMBUSTION FOR SUSTAINABLE ENERGY APPLICATION (TERRESTRIAN AND SPACE APPLICATIONS) II

Chair: H. Wang, Beijing University, Beijing, PRC

B24 **GREEN IRON AND ALUMINUM AS RECYCLABLE ENERGY CARRIERS IN CIRCULAR ECONOMY**
C. Hasse
TU Darmstadt, D

B25 **COMBUSTION OF METAL PARTICLES IN VARIOUS GASES – INVESTIGATION AND RECENT APPLICATION**
V. Weiser
Fraunhofer ICT, Pfinztal, D

Bus transfer to hotels, Karlsruhe City and Main Station will be available (starting 19.00 h during the whole evening).

Friday, June 27

LECTURE ROOM A

Session A6

CHARACTERIZATION OF ENERGETIC MATERIALS USING AI/ML I

Chair: J. Pachman, University of Pardubice, CZ

09.00 **A26** **PREDICTING PROPELLANT HEAT FLOW CALORIMETRY TIMESERIES WITH MACHINE LEARNING**
O. Schoenmakers, B. Mortier, W. Boon, S. de Koster
TNO, NL

09.20 **A27** **MACHINE LEARNING METHODS FOR ANALYSING DAMAGE IN ENERGETICAL GRANULAR MATERIALS**
C. Robin, F. Willot, P. Dokladal
Centre de Morphologie Mathematique, Mines Paris, F
S. Belon, E. Kaeshammer
CEA, Gramat, F
L. Borne, E. Fousson
ISL, Saint-Louis, F

09.40 **A28** **DEFECT CHARACTERISATION IN ICT SCANNED ENERGETIC MATERIALS USING MACHINE LEARNING**
L. Green, R. Jones, A. Milroy
QinetiQ, Farnborough, UK

10.00 **A29** **RESEARCH ON THE PREDICTION OF MECHANICAL PROPERTIES OF ENERGETIC MATERIALS USING MACHINE LEARNING TECHNIQUES**
Wang Donglei, Yuan Hongwei, Liu Xuwang,
Pang Haiyan
Institute of Chemical Materials CAEP, Sichuan, PRC

10.20 **Coffee Break**

LECTURE ROOM B

Session B7

MUNITIONS IN THE SEA

Chair: A. Keßler, Fraunhofer ICT

B26 **EUROPEAN RESEARCH AND INNOVATION ADDRESSING UNDERWATER MUNITION**
T. Kiefer, J. Kandziora, P. Trautendorfer
JPI Oceans, Brussels, B
A. Keßler
Fraunhofer ICT, Pfinztal, D

B27 **AMMUNITION IN SWISS LAKES: HISTORY, INVESTIGATIONS AND CURRENT SITUATION**
A.-L. Gassner, S. Pasche
armasuisse, CH

B28 **NATO STUDIES ON SEA-DUMPED MUNITIONS**
A. S. Cumming
University of Edinburgh, UK

B29 **DEVELOPMENT AND CONSTRUCTION OF AN INDUSTRIAL PLANT FOR THE DISPOSAL OF MUNITIONS AT SEA**
W. Sichermann
Seascape GmbH, Hamburg, DE

LECTURE ROOM A

Session A7

HIGH EXPLOSIVES

Chair: U. Schaller, Fraunhofer ICT

11.00 **A30** **EXPERIMENTAL DATA REQUIRED FOR CALIBRATION OF REACTIVE BURN MODELS IN PREDICTIVE EXPLOSIVE SIMULATIONS**
J. D. Olles, A. F. Haslam, P. A. Fasano, C. D. Woodruff, R. T. Ichiyama, J. R. White
NSWC, Indian Head, USA

11.20 **A31** **SURVIVABILITY OF EXPLOSIVES WITH DYNAMICALLY COLLAPSING CAVITIES**
J. Felts
NSWC, Indian Head, USA
H. Sandusky
Energetics Technology Center, Indian Head, USA

11.40 **A32** tba

12.00 **Awards and Closing Remarks**

12.20 **Lunch**

13.45 **End of Conference**

LECTURE ROOM B

Session B8

PROPELLANTS

Chair: H. Östmark, FOI, SE

B30 **NUMERICAL ANALYSIS OF MICROSCALE COMBUSTION PHENOMENA IN COMPOSITE SOLID ROCKET PROPELLANTS**

P. Pietrek, M. Moroff
Fraunhofer ICT, Pfinztal, D

B31 **SAFETY AND PERFORMANCE EVALUATION OF A NEW HIGH-PERFORMANCE MONOPROPELLANT FORMED OF MICROENCAPSULATED FUELS IN COMBINATION WITH HYDROGEN PEROXIDE**

R. Scholl, D. Freudenmann, S. Schlechtriem
DLR, Hardthausen, D

B32 **SYNTHESIS, CHARACERIZATION AND COMPARATIVE ANALYSIS OF THREE ENERGETIC PLASTICIZERS EXPLORING THE IMPACT OF DIVERSE FUNCTIONAL GROUPS ON PROPERTIES AND PERFORMANCE**

J. T. Lechner, T. B. Keicher
Fraunhofer ICT, Pfinztal, D

Poster Program

Posters will be presented during the whole Conference.
A special **Poster Session** will take place on **Thursday, June 26, 14.00 – 15.00 h**. During this time authors should be present for discussion at their posters in the foyer of the Conference Hall.

P1 **PREDICTING THE THERMAL DEGRADATION OF ENERGETIC POLYMERS BY MEANS OF ARTIFICIAL NEURAL NETWORKS**
M. Ticherfatine
Ecole Nationale Superieure des Technologies Avancees, Algiers, ALG

P2 **EXPLORING THE IMPACT OF ENERGETIC POLYSACCHARIDE DOPANTS ON HTPB-PROPELLANTS PERFORMANCE USING NASA-CEA SIMULATION**
M. Jouini, D. Trache, A. Abdelaziz, A.F. Tarchoun
Ecole Militaire Polytechnique, Algiers, ALG

P3 **PRINCIPAL COMPONENT ANALYSIS (PCA) OF DSC DATA: CRAFTING A UNIVERSAL PREDICTIVE MODEL FOR THE EQUIVALENT IN-SERVICE-TIME OF DOUBLE BASE ROCKET PROPELLANTS**
S. Chelouche, D. Trache, A.F. Tarchoun, A. Abdelaziz, S. Bekhouche
Ecole Militaire Polytechnique, Algiers, ALG

P4 **ACCELERATING DISCOVERY OF FLUORINE-BASED ENERGETIC POLYMERS THROUGH MACHINE LEARNING AND DENSITY FUNCTIONAL THEORY**
Siyan Deng, Serene Hay Yee Chan, Huey Hoon Hng
Nanyang Technological University, Singapore, SGP

P5 **EXPLORING THE EFFECTS OF NITROCELLULOSE-COATED NCUO ON THE THERMAL PROPERTIES AND KINETIC SIMULATION BEHAVIOR OF AMMONIUM NITRATE-BASED SOLID COMPOSITE PROPELLANTS WITH POLYURETHANE/ NITROCELLULOSE BLEND BINDERS**
M. Nourine, M.K. Boulkadid, S. Touidjine, H. Akbi, S. Belkhiri
Ecole Militaire Polytechnique, Algiers, ALG

P6 THE ROLE OF OXYGEN AND MOISTURE IN THE CHEMICAL COMPATIBILITY OF A NITRATE ESTER
E. Glascoe, C. Cockreham, J. Rosener, S. Hawks
Lawrence Livermore National Laboratory, USA

P7 TOPOGRAPHIC INVESTIGATIONS OF VARIOUS HMX GRADES
M. Herrmann, H. Weyrauch
Fraunhofer ICT, Pfinztal, D

P8 HIM_30: DESIGN AND EVALUATION OF A METAL-FREE HYPERGOLIC BIPROPELLANT BASED ON IONIC LIQUIDS AND HYDROGEN PEROXIDE
S.C. Stölzle, D. Freudenmann
DLR, Hardthausen, D

P9 XPDFSUITE – A TOOL COLLECTION FOR THE PAIR DISTRIBUTION FUNCTION ANALYSIS (PDF)
P.B. Kempa, M. Herrmann
Fraunhofer ICT, Pfinztal, D

P10 INVESTIGATION OF BU NENA IMPACT ON THE SENSITIVITY OF GUN PROPELLANTS
J. Ehrhardt, J. Glorian, B. Baschung
ISL, Saint-Louis, F

P11 ASSESSMENT OF THE INTERACTION BETWEEN AMMONIUM DINITRAMIDE (ADN) AND A TRIAZINE BONDING AGENT FOR APPLICATION ON TECHNOLOGIES OF COMPOSITE SOLID PROPELLANTS
J.O. Silva, J.R.C. Silva, K.P. Cardoso, L.F.A. Ferrao
Instituto Tecnologico de Aeronautica ITA,
Sao Jose dos Campos, BR
M.F. Diniz, M.Y. Nagamachi
Instituto de Aeronautica e Espaco IAE,
Sao Jose dos Campos, BR

P12 AI AND MACHINE LEARNING FOR PREDICTING QUANTUM TUNNELING EFFECTS IN ENERGETIC MATERIALS
Zihao Guo
School of Chemical Engineering NJUST, Nanjing, PRC

P13 EXPLORING THE SOLVENT-BASED MANNICH REACTION FOR DESIGNING HIGH-PERFORMANCE BENZOXAZINE
S. Abdous, M. Derradji, K. Khiari, O. Mehelli, H. Abdelmalek
Ecole Militaire Polytechnique, Algiers, ALG

P14 HIGH SPATIAL AND TEMPORAL RESOLUTION SENSORS BASED ON GAS IONIZATION: APPLICATION TO THE STUDY OF ENERGETIC BINDER
L. Jumpertz, L. Borne, F. Lutz, F. Schlesser, E. Fousson
ISL, Saint Louis, F

P15 INVESTIGATING THE IMPACT OF GREEN NANO-METAL OXIDES (COPPER AND IRON) ON THE THERMAL DECOMPOSITION BEHAVIOR OF ADVANCED PROPELLANTS WITH NITROCELLULOSE/POLYURETHANE BINDERS
B. Rebiba, S. Touidjine
Ecole Militaire Polytechnique, Algiers, ALG

P16 HOW CAN MOMENTUM TRANSFERS IN A BURNING MIXTURE OF AL/CUO PARTICLE POWDER BE MODELLED?
H. Magliano, D. Gauchard, A. Esteve, C. Rossi
LAAS-CNRS University of Toulouse, F
O. Simonin, P. Fede
IMFT University of Toulouse, F

P17 VIBRATION-INDUCED DEGRADATION OF THE MECHANICAL PROPERTIES OF COMPOSITE ROCKET PROPELLANTS
M. Ferrapontoff Lemos, J.G. Passos Rodrigues, F. Santos da Luz
Brazilian Navy Research Institute, Rio de Janeiro, BR
M. Heil, M. Bohn
Fraunhofer ICT, Pfinztal, D

P18 STUDY ON CATALYST-FREE CLICK REACTIVITY, IMPACT SENSITIVITY AND MIGRATION RESISTANCE OF GAP-BASED PU BINDERS WITH REACTIVE SPIRANE PLASTICIZERS
Mingyang Ma, Younghwan Kwon
Daegu University, Gyeongsan, ROK

P19 EED IGNITION IN RELATION TO RADAR PEAK AND AVERAGE POWER
R.H.B. Bouma, A.P.M. Zwamborn, E.J. Kroon
TNO, The Hague, NL

P20 SUBSCALE COMBUSTION TESTING AND MODELING OF ENCAPSULATED NITRATE ESTERS AS IGNITERS
D.T. Bird, C.A. Houthuysen
US Army DEVCOM, Picatinny Arsenal, USA

P21 CALCULATION OF LENNARD-JONES PARAMETERS BY DENSITY FUNCTIONAL THEORY CALCULATIONS
A. Omlor
Fraunhofer ICT, Pfinztal, D

P22 MOLECULAR SIMULATION OF REACTION MECHANISMS AND TRANSITION STATES
A. Omlor, M. Bohn
Fraunhofer ICT, Pfinztal, D

P23 CHEMICAL STABILITY OF THE CHNO-OXIDIZER TNEF
M.A. Bohn, J. Lechner, M. Heil
Fraunhofer ICT, Pfinztal, D
T.M. Klapötke
Ludwig-Maximilian-University, München, D

P24 CAN MACHINE LEARNING HELP TO IMPROVE STABILITY OF ENERGETIC MATERIALS?
M. Heil, J. Langer, C. Fuchs, A. Kamienska-Duda, M. Szkudlarek
Fraunhofer ICT, Pfinztal, D

P25 SOLUBILITY BEHAVIOR OF THE CL-20-MDNT COCRYSTAL SYSTEM AND IMPROVED SENSITIVITY THROUGH VACUUM EVAPORATIVE CRYSTALLIZATION
E. Wegert, P. Schultz
Fraunhofer ICT, Pfinztal, D

P26 DEVELOPMENT AND VALIDATION OF A NUMERICAL MODEL FOR MULTI-MATERIAL SOLID ROCKET MOTORS
M. Moroff
Fraunhofer ICT, Pfinztal, D

P27 MODELLING THE BURN RATE OF THERMITES WITH A DOE APPROACH
W. Becker, S. Knapp, D. Bieroth
Fraunhofer ICT, Pfinztal, D

P28 COMBUSTION OF IRON PARTICLES IN OXYGEN AND AIR AS A REGENERATIVE ENERGY CARRIER ON EARTH AND THE MOON
V. Weiser, P. Pietrek, S. Knapp, S. Kelzenberg, M. del Mar Juez-Lorenzo, C. Seidel, D. Bieroth
Fraunhofer ICT, Pfinztal, D

P29 NUMERICAL STUDY OF MULTI-MATERIAL SOLID ROCKET MOTORS FEATURING COMPLEX GRAIN STRUCTURES
M. Hausmann
Fraunhofer ICT, Pfinztal, D

P30 OBSERVATION OF DECOMPOSITION OF AMMONIUM DINITRAMIDE BY MEANS OF X-RAY DIFFRACTION
C. Seidel, M. Herrmann
Fraunhofer ICT, Pfinztal, D

P31 FIRST SYNTHESIS OF AN ENERGETIC DIACRYLATE FOR ADVANCED 3D PRINTING OF ENERGETIC MATERIALS
H. Wegner, A. Mendl, D. Boskovic, U. Schaller
Fraunhofer ICT, Pfinztal, D

P32 IMPROVING THE MECHANICAL PROPERTIES OF 3D PRINTED GUN PROPELLANTS
D. Mitro, A. Dresel
Fraunhofer ICT, Pfinztal, D

P33 EXPERIMENTAL AND NUMERICAL INVESTIGATION OF DIFFERENT DETONATORS IN TERMS OF THE INITIATION STIMULUS
T. Heidebrecht, C. Zimmermann
Fraunhofer ICT, Pfinztal, D

P34 BLAST SIMULATION: THERMAL AND MATERIAL ANALYSIS
M. Lasota, T. Heidebrecht, C. Zimmermann, S. Wurster
Fraunhofer ICT, Pfinztal, D

P35 INVESTIGATION ON PHYSICS AWARE NEURAL NETWORKS FOR THE DETERMINATION OF DETONATION PARAMETERS OF NON-IDEAL EXPLOSIVES
D. Tomaschewski, F. Steinhauser
Fraunhofer ICT, Pfinztal, D

P36 HITDOC – THE FIRST EDF TECHNOLOGICAL CHALLENGE, ADDRESSING TECHNOLOGIES FOR THE DETECTION OF LANDMINES AND IMPROVISED EXPLOSIVE DEVICES (IEDS)

I. Wilhelm, F. Schnürer
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H. Önnerud, D. Letalick
FOI, SE
D. Deiana, M. Koolloos
TNO, NL
J.J. Navlet Salvatierra, J.M. Gomez Sanz
INTA, ES

P37 SEMI-AUTOMATED SPECTRAL QUANTIFICATION OF THE CONCENTRATION OF INGREDIENTS IN GUN PROPELLANTS

J. Langer, M. Heil, C. Fuchs
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P38 DUMPED AMMUNITION – A CHALLENGE FOR ARTIFICIAL INTELLIGENCE FOR THE 21st CENTURY

T. Salacinski, M. Szala, B. Wiaderek, K. Rzadkowska
Military University of Technology, Warsaw, PL

P39 HIGH-ENERGY BALL MILLING: AN ALTERNATIVE TECHNIQUE FOR PREPARING REACTIVE NANOPOWDERS

P.-H. Esposito, R. Denoyel, M.-V. Coulet
Aix-Marseille University CNRS, Marseille, F

P40 PARAMETRIC MODELLING OF COMPLEX AGEING BEHAVIOR OF TENSILE MODULUS IN CTPB-BONDED PROPELLANT

M.A. Bohn
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G.S. Tussiwand
HAPTICA s.r.l., Busto Arsizio, IT

P41 FLASHPOINT PREDICTION

T. Wombacher, K. Lehmann
Merck Life Science, Darmstadt, D

P42 EFFECT OF CARBON NANOTUBES ON THERMAL DECOMPOSITION OF CL-20 EXPLOSIVE: A MOLECULAR DYNAMICS SIMULATION STUDY
Shupei Zhang, Danyang Liu, Kun Yang, Jianying Lu, Lixiang Zhong, Junying Wu, Lang Chen
Beijing Institute of Technology, Beijing, PRC

P43 SYNTHESIS AND APPLICATION OF HIGH IRON CONTENT FERROCENE DERIVATIVE POLYMER AS COMBUSTION CATALYST
Mushuang Qian, Xiaoqiang Li, Jiaxin Liu, Jun Yang
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P44 ENERGETIC MATERIALS BASED ON PARAFFIN USED IN A SPACE INDUSTRY AS FUELS FOR HYBRID ROCKET ENGINES
B. Smetana, M. Kawulokova, S. Zla, P. Dostal, H. Matuskova, J. Dobrovska
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C. Boros
Borospace s.r.o., Bratislava, SK

P45 THE STUDY ON THE STABILITY OF HAN BASED GEL PROPELLANT
Jun Yang, Hui Li
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P46 A COMPREHENSIVE INVESTIGATION INTO SAFETY AND YIELD FOR SYNTHESIS OF LOW-SENSITIVITY HIGH EXPLOSIVE 3-NITRO-1,2,4-TRIAZOL-5-ONE
M. Elnegoumy, C. Dubois, E. Comtois
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A. Elbeih
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P47 THERMODYNAMIC CRITERIUM FOR EXPLOSIVE MATERIALS AND DETONATIVE REACTIONS
E.-C. Koch
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P48 TERNARY THERMITES: INFLUENCE OF MIXING RATIO ON THERMITE REACTIONS
E. Roth, S. Knapp, A. Raab
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Notes

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Conference Management

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