

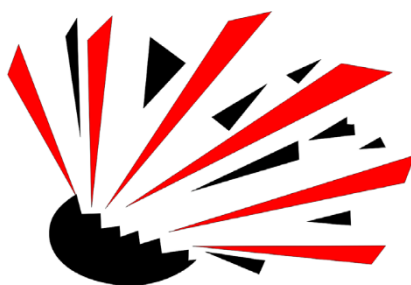
UNIVERSITY OF PARDUBICE

Faculty of Chemical Technology, Institute of Energetic Materials

PROGRAM

of the 27th seminar

**NEW TRENDS IN RESEARCH
OF ENERGETIC MATERIALS**



NTREM 2025

Pardubice, Czech Republic, April 2nd – 4th, 2025

<http://www.ntrem.com>

intended as a meeting of students, postgraduate students, university teachers and young research and development workers, with interest in energetic materials

27th INTERNATIONAL SEMINAR
“NEW TRENDS IN RESEARCH OF ENERGETIC MATERIALS”

www.ntrem.com

is supported by:



Austin Powder, Vsetin, Czech Republic



Astotec Pyrotechnic Solutions, Austria



BiaZZi, Switzerland



Explosia, Pardubice, Czech Republic



Faculty of Chemical Technology, University of Pardubice, Czech Republic



MSM GROUP, S.R.O, Dubnica nad Vahom, Slovak Republic



Nicolet CZ s.r.o., Praha, Czech Republic



STV Technology a.s., Policka, Czech Republic



OZM Research, Bliznovice, Czech Republic



Sellier & Bellot, Vlasim, Czech Republic



SSE Explo, Tucharice, Czech Republic

NTREM is an international meeting of students and early career researchers who are involved in the fundamental understanding, development, technology, industry or application of energetic materials. The seminar enables the presentation of research and allows feedback and interaction with senior, well established experts in the field. In addition, participants will meet and form networks enabling them to communicate amongst each other. It is expected that the seminar will help career progression. The Seminar is intended to provide a pleasant and welcoming atmosphere where exchange of professional experiences goes along with building of strong personal relations among young specialists working in the field of EM.

Papers should not only describe research work itself, but should also demonstrate awareness of the context and background for the research.

The seminar is organized by staff members of the Institute of Energetic Materials University of Pardubice and in accordance with the tradition of previous meetings will take place at the University Hall.

The official language of the seminar is English and all contributions shall be presented and written exclusively in the English language.

Registration fee: 200 € paid on spot.

Registration: registration of participants will take place at the University Hall:

April 1 th	16:00 - 18:00	with welcome snack at the University Hall
April 4 th	07:30 - 09:00	

Proceedings of the presented contributions will be prepared by the organizers of the seminar by the date of its opening; price of the proceedings will be 3500 CZK (i. e. ~180 \$, 140 €) printed version and 500 CZK (i. e. ~25 \$, 20 €) CD version – the prices are valid at the time of the seminar. The USB with Proceedings will be provided to the main authors and participants of the seminar free of charge.

Please, visit the web site www.ntrem.com for updates

Chairman of the Seminar:

Assoc. Prof. Jiri Pachman

IEM, FCT University of Pardubice, CR

Chairman of the Scientific Committee:

Prof. Adam Cumming

University of Edinburgh, UK

Members of the Scientific Committee:

Assoc. Prof. Taner Atalar

Tubitak Sage, Turkey

Dr. Manfred A. Bohn

Fraunhofer ICT, Pfinztal, Germany

Assoc. Prof. Chris Braithwaite

University of Cambridge, UK

Prof. Martin Braithwaite

University of Cambridge, UK

Prof. Jose A. Campos

University of Coimbra, Portugal

Dr. David Chavez

Los Alamos National Laboratory, NM, USA

Dr. Ruth Doherty

Energetics Technology Center, Indian Head, Maryland, USA

Dr. Stefan Ek

FOI, Stockholm, Sweden

Prof. Michael Gozin

University of Tel Aviv, Israel

Prof. Antoine van der Heijden

TNO, Rijswijk, Netherlands

Prof. Thomas Klapötke

Ludwig-Maximilians-Universität München, Germany

Prof. Pavel Konečný

University of Defense, Brno, CR

Dr. Jasmin T. Lechner

Fraunhofer ICT, Pfinztal, Germany

Prof. Michel Lefebvre

Royal Military Academy, Brussels, Belgium

Prof. Jimmie Oxley

University of Rhode Island, Kingston, USA

Dr. Davin Piercey

Purdue University, West Lafayette, USA

Dr. William Proud

Imperial College London, United Kingdom

Prof. Karl Rink

University of Idaho, Moscow, USA

Prof. Traian Rotariu

Military Technical Academy, Bucharest, Romania

Prof. Muhamed Sućeska

University of Zagreb, Zagreb, Croatia

Prof. Raphaël Terreux

Université Claude Bernard, Lyon, France

Prof. Waldemar A. Trzeciński

Military University Technology, Warsaw, Poland

Prof. Abbaraju Venkataraman

Gulbarga University, Kalaburagi, India

Organizing Committee

Chairman of the Committee:

Dr. Marcela Jungova

IEM, FCT, University of Pardubice, CR

Members of the Committee:

Dr. Jakub Selesovsky

IEM, FCT, University of Pardubice, CR

Dr. Iva Ulbrichova

Dean Office, FCT, University of Pardubice, CR

Organizing committee of NTREM:

Institute of Energetic Materials
Faculty of Chemical Technology
University of Pardubice
532 10 Pardubice
CZ, European Union

Phone: (+420) 46 603 8023
E-mail: seminar@ntrem.com

Affiliated activities:

The first meeting of the scientific committee will be held on Tuesday, April 1st, 2025 at 18:00 in the “Garden Restaurant”, the second one on Thursday, April 3rd, 2025 at 16:00 at the University Hall.

A friendly get-together for NTREM participants will take place on Thursday, April 3rd, 2025 at 19:30 – 22:00, in the House of Technology, Pardubice (see the last page for map).

LECTURE PROGRAM OF THE 27th NTREM – WEDNESDAY APRIL 2nd

- 07:30 - 09:00** **REGISTRATION**
- 8:20** **SEMINAR OPENING BY SCHOOL REPRESENTATIVE**
- 8:30** **ORGANIZATION REMARKS**

1. Session

Chairman: Prof. Thomas Klapötke
 Ludwig-Maximilians-Universität München, Germany

MEETING OF SPEAKERS WITH CHAIRMAN

- 08:40** A synthetic route to 3,5-dinitropyridine analogs and evaluation of their thermal properties
Leidy Hooker *p.*
- 09:00** Investigations on energetic nitro substituted cubanes
Andreas Bartonek *p.*
- 09:20** Energetic polymers derived from oxetanes
Natasha H. Boulton *p.*
- 09:40** Triazol polymer, first step for a self-healing PBX
Frederick Lacemon
- 10:00** Synthesis and evaluation of novel TATB-inspired energetic materials
Meghan C. Benda

10:20 - 10:40 COFFEE BREAK

- 10:40** Reinvestigation of alkali and alkaline earth metal styphnate salts as components for priming compositions
Shouei Yiu *p.*
- 11:00** Novel explosive method for the synthesis of silver nanoparticles
Jan Maurycy Uszko *p.*
- 11:20** Mitigating Environmental Impact of TNT Production: Strategies for Red Water Reduction and Treatment
Lukas Bauer *p.*
- 11:40** Isocyanate-free energetic polymer binders
Thomas Bugnand *p.*

12:00 – 14:00 LUNCH BREAK

2. Session

Chairman: Prof. Michael Gozin
University of Tel Aviv, Israel

14:00 PETN under pressure *p.*
Heather M. Quayle

14:20 Optimization of fiber optic probe for measuring detonation velocity *p.*
Stepan Jirman

14:40 Towards purifying polyvinyl nitrate *p.*
Stephen Spice

15:00 Long term decomposition and crystallisation kinetics of ADN under some
crystallographic aspects *p.*
Peter Schultz

15:20 – 15:40 **COFFEE BREAK**

15:40 Research on material model and parameters of metal thin plate under close-in explosion *p.*
load
Xing-long Li

16:00 Energy output of HMX-based aluminized explosives with varying aluminum (Al) and *p.*
polytetrafluoroethylene (PTFE) ratios
Wei Cao

16:20 Construction of a composite surface coating layer with high efficiency on desensitization *p.*
of HMX
Shuyi Duan

POSTER SESSION INTRODUCTION

16:40 2 min each poster presenter

3. Session

Chairman: Dr. Ruth Doherty
Energetics Technology Center, Indian Head, Maryland, USA

MEETING OF SPEAKERS WITH CHAIRMAN

- 08:40** Aluminized highly energetic materials simulation under partial chemical equilibrium assumption with HEMSim
Yuri Caridi *p.*
- 09:00** Exploring complex potential energy landscapes of computationally modelled ballistic modifiers
Harvey J. Newman *p.*
- 09:20** Thermal Isolation Modeling of Aluminized Energetic Materials for Low-Cost Computational Code
Andrea Cucuzzella *p.*
- 09:40** An improved statistical analysis of 72 sensitivity datasets
Dennis Christensen *p.*
- 10:00** Comparing thermal and chemical analysis of aged and unaged NC-based propellants
Reinier de Vries

10:20 – 10:40 COFFEE BREAK

10:40 2 MINUTES ORAL POSTER INTRODUCTION (2-3 SLIDES PRESENTATION)

11:40 GROUP PHOTOGRAPHY

12:00 – 14:00 LUNCH BREAK

4. Poster Session

Chairman: Assoc. Prof. Jiri Pachman
IEM, FCT University of Pardubice, CR

P1	Studies on inert surrogate for pressable plastic bonded explosives <i>Ö. Güneş Ekim</i>	<i>p.</i>
P2	Catalyst screening for reaction of HTPB and IPDI in PBX formulations <i>M. Erdurucan</i>	<i>p.</i>
P3	Synthesis and characterisation of the novel energet <i>B. Westwater</i>	<i>p.</i>
P4	Molecular simulation of reaction mechanisms and transition states <i>A. Omlor</i>	<i>p.</i>
P5	Enhancing the rheological and processing properties of PBX explosives containing boron through surface modifications and compatibilization with the binder <i>D. Bajić</i>	<i>p.</i>
P6	Study on the influence of material properties and explosive quantities on the formation of Explosively Formed Projectiles (EFP) <i>I. Păcurar</i>	<i>p.</i>
P7	Measuring powder flow parameters of inert simulants for 3D printing explosives <i>R. Al-Dhaheri</i>	<i>p.</i>
P8	The synthesis and characterization of energetic materials containing both a tetrazole and a strained ring moiety <i>J. Zuckerman</i>	<i>p.</i>
P9	Microwave synthesis of triethylene glycol diazide (TEGDA): Advanced approaches and characterization <i>J. T. Lechner</i>	<i>p.</i>
P10	Numerical and experimental analysis of Semtex 1A blast wave parameters <i>R. Fosse</i>	<i>p.</i>
P11	Investigating the effect of graphene / graphene oxide on the crystallization and polymorphic stability of ammonium nitrate <i>F. Alhosani</i>	<i>p.</i>
P12	Calorimetric bomb test as a method for the selection of optimal boron powder for pyrotechnic applications <i>M. Krstović</i>	<i>p.</i>
P13	The danger related to the use of ammunition and explosives <i>J. Rečko</i>	<i>p.</i>
P14	Comparative analysis of the ESD sensitivity of B/KNO ₃ and B ₄ C/KNO ₃ pyrotechnic compositions <i>P. Hřebíčková</i>	<i>p.</i>

P15	Synthesis and characterization of novel transition metal coordination compounds of 5-(3,5-dinitro-1H-pyrazol-4-yl)-1H-tetrazole <i>W. J. Greenwood</i>	<i>p.</i>
P16	Hazard evaluation of nitrocellulose synthesized from okara (soy bean-curd refuse) as a raw material <i>K. Aritomi</i>	<i>p.</i>
P17	The desulfurization of high nitrogen heterocycles <i>J. Zuckerman</i>	<i>p.</i>
P18	Surface structures of HMX crystals investigated by means of confocal and atomic force microscopy <i>M. Herrmann</i>	<i>p.</i>
P19	Synthesis and characterization of 1-hydroxy-5-methyltetrazole and its energetic salts <i>L. J. Eberhardt</i>	<i>p.</i>
P20	Characterizing the decomposition and hydrate stability of sodium 5,5'-azotetrazolate <i>J. Mikuláščík</i>	<i>p.</i>
P21	Effect of copper tube quality on the cylinder expansion test results <i>M. Künzel</i>	<i>p.</i>
P22	OPTIMEX: Optimization of a simple plane wave generator <i>M. Künzel</i>	<i>p.</i>
P23	Synthesis and evaluation of HEDOs in propellant formulations <i>R. Dobson</i>	<i>p.</i>
P24	Research on TNT equivalence of different PBX with aluminium and magnesium <i>J. Bogdanov</i>	<i>p.</i>
P25	Thermal characterization of CHNO-oxidizer TNEF <i>M. A. Bohn</i>	<i>p.</i>
P26	Strategies for treating explosives-contaminated wastewater: addressing the environmental and health challenges of yellow, pink and especially red water <i>J. Heidrich</i>	<i>p.</i>
P27	LOVA propellants based on RDX and GAP energetic plasticizers - Part 2 <i>D. Holeoleo</i>	<i>p.</i>
P28	Selective synthesis of energetic acrylates using microreaction technology <i>H. Wegner</i>	<i>p.</i>
P29	Thermal decomposition behavior of nitrocellulose in the presence of nitric acid solution <i>D. Kinjo</i>	<i>p.</i>
P30	Comparative analysis and charge modeling using additive manufacturing in explosive breaching <i>M. Sedláček</i>	<i>p.</i>

P31	Numerical study regarding the functioning of solid rocket motor using 3d printed grain <i>A. M. Braic</i>	<i>p.</i>
P32	High-speed visualization and piezosensor monitoring of shocktube reaction propagation <i>M. Kreisl</i>	<i>p.</i>
P33	Replacement of RDX by TKX-50 in a plastic bonded explosive based on Viton A <i>A. A. Helmy</i>	<i>p.</i>
P34	Study on performance and safety characteristics of multilayer composite propellants <i>I. Dan</i>	<i>p.</i>
P35	Effects of the explosion-generated plasma on the ammunition shell <i>Z. Bajić</i>	<i>p.</i>
P36	Measurement of a single fragment's velocity by using a controlled fragmentation method <i>M. Tagawa</i>	<i>p.</i>
P37	Effect of 3D printed shaped charge liner on the effectiveness of shaped charges <i>M. Bilina</i>	<i>p.</i>
P38	New smoke formulations based on copper (II) phthalocyanine <i>A. Schweiger</i>	<i>p.</i>
P39	Rocket motor insulation – different fillers and their effect on rheological behavior and internal structure <i>D. Fromm</i>	<i>p.</i>
P40	Lead oxide(II, IV) replacement in gasless pyrotechnic time delay compositions <i>M. Gerlich</i>	<i>p.</i>
P41	IEM research labs at the start to safety 2.0 <i>M. Vitik</i>	<i>p.</i>
16:30	SCIENTIFIC COMMITTEE MEETING AT LECTURE HALL	
18:30	SOCIAL EVENT - BANQUET AT HOUSE OF TECHNOLOGY	

LECTURE PROGRAM OF THE 27th NTREM – FRIDAY APRIL 4th

5. Session

Chairman: Prof. Adam Cumming
(University of Edinburgh, UK)

MEETING OF SPEAKERS WITH CHAIRMAN

08:50 Modelling complex ageing behavior of tensile modulus in CTPB-bonded propellant – parametric and kinetically based procedures
Manfred Bohn *p.*

09:20 New green solvents for high dissolution and the mechanism of strongly hydrogen-bonded explosives
Jianbo Chen *p.*

09:40 LLM-105: achieving different morphologies for different properties
Eric Pasquinet *p.*

10:00 Synthesis and characterisation of the energetic plasticiser Bu-AENA
Stefan Ek *p.*

10:20 – 10:40 COFFEE BREAK

10:40 An overview of vibration effects on energetic materials
Maurício Ferrapontoff Lemos *p.*

11:00 Some issues of hydroxyl derivatives of ferrocene as burning rate modifiers of composite propellants
Tomasz Salaciński *p.*

11:20 BKNO₃ pyrotechnic igniters for SRM: analysis of performance dispersion from development to production
Barbara Betti *p.*

12:00 PRIZE AWARDS & CLOSING THE SEMINAR



①

MAIN VENUE
UNIVERSITY HALL

(Aula Arnošta z Pardubic)

Studentská 519, Pardubice

<https://mapy.cz/s/larunemona>

50.0496653N, 15.7665203E



②

BANQUET
HOUSE OF TECHNOLOGY

(Dům Techniky)

Náměstí Republiky 2686,
Pardubice

<https://mapy.cz/s/hebuvenade>

50.0372314N, 15.7770425E



③

PARKING HOUSE
IN TOWN

Parkovací dům

Karla IV. 2749, Pardubice

<https://mapy.cz/s/muzekacore>

50.0362419N, 15.7793439E

Bus or Trolleybus - more info at www.dpmp.cz

From the Main Train Station to University Hall – line 3, 17, 33 (Polabiny Hradecká – stop No. 6)

From the Main Train Station to House of Technology – line 6, 8, 9, 12 (Náměstí Republiky – stop No. 4)

