BALKAN ASSOCIATION OF POWER TRANSMISSIONS 2025

under the auspices of:

National Technical University of Athens

10th INTERNATIONAL BAPT CONFERENCE

POWER TRANSMISSIONS

9-11 JULY 2025

ATHENS GREECE

Eugenides Foundation

CONFERENCE PROGRAMME

Professional Congress Organizer:

convin

CONVIN S.A. 29 K. Varnali str,
15233 Chalandri Athens, Greece

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1ST CONFERENCE DAY: WEDNESDAY JULY 9TH 2025

- **08:00** REGISTRATION

- **09:30** **PLENARY SESSION AT THE MAIN HALL**

WELCOME SPEECH AND OPENING OF THE 10TH INTERNATIONAL BAPT CONFERENCE - POWER TRANSMISSIONS

Prof. Vasilios Spitas
President of BAPT, Vice Dean School of Mechanical Engineering, NTUA, Athens, Greece

Prof. Ioannis Antoniadis
Dean, School of Mechanical Engineering, NTUA, Athens, Greece

Prof. Ioannis Chatzigeorgiou
Rector, NTUA, Athens, Greece

- **10:00** **KEYNOTE SESSIONS**

Dr. Konstantinos Laskaris
Director, Motor technology and Tesla humanoid robot actuators

Dr. Manolis Mavratzotis
Head of Innovation and Sustainability Europe East, SIKA

➢ **11:45** COFFEE BREAK – MEET & GREET

➢ **12:30**

MAIN SESSIONS

AI APPLICATIONS IN MECHANICAL ENGINEERING | **CHAIRS: C. PAPADOPOULOS, I. KALOGERIS**

QUANTIFYING THE ECONOMIC BENEFIT OF AI-POWERED SURROGATES IN COMPUTATIONAL MECHANICS
Ioannis Kalogeris, Christos Kalligeros

A HYBRID DIGITAL TWIN AND AI-BASED FRAMEWORK FOR MARINE SHAFTLINE MONITORING AND BEARING CONDITION PROGNOSTICS
Georgios N. Rossopoulos, Georgios Charvalos, Christos I. Papadopoulos

HIGH-FIDELITY GRAPH NEURAL NETWORK SURROGATE MODELING FOR SPUR GEAR FINITE ELEMENT ANALYSIS
Georgios Kostopoulos, Christos Kalligeros, Vasilios Spitas

➢ **13:30** LUNCH BREAK

➢ **14:30**

MAIN SESSIONS

DESIGN ANALYSIS AND OPTIMIZATION | **CHAIRS: T. LAZOVIC, C. KALLIGEROS**

INVESTIGATING THE EFFECT OF THE TOOTH FLANK PROFILE ON GEAR EFFICIENCY
Ioannis - Iasonas Savouris, Christos Kalligeros, Vasilios Spitas

AN IMPLEMENTATION AND COMPARISON BETWEEN TWO MULTIOBJECTIVE OPTIMIZATION PROCESSES IN WATER LUBRICATED BEARINGS DESIGN
Ioannis Pervelis, Georgios N. Rossopoulos, Christos I. Papadopoulos

GEOMETRICAL AND TOPOLOGICAL OPTIMIZATION OF A MULTI-STAGE WIND TURBINE GEARBOX TO IMPROVE WEIGHT AND EFFICIENCY
Ilias Georgiou, Christos - Dionysios Gkanis, Evlampia Machaira, Christos Kalligeros, Vasilios Spitas

INVESTIGATING THE EFFECT OF PROFILE ADDENDUM MODIFICATIONS TO THE DYNAMIC RESPONSE OF SPUR GEARS
Rossanna Theodora Douma, Myrto Jenny Macmillan, Christos Kalligeros, Vasilios Spitas

➢ **16:00** COFFEE BREAK

➢ 16:30

MAIN SESSIONS

METROLOGY | **CHAIRS: TAPOGLOU, KAISARLIS**

GENERATION OF DAMAGED GEAR GEOMETRY USING A SYSTEMATIC REVERSE ENGINEERING METHODOLOGY
Dimitrios Kryfos

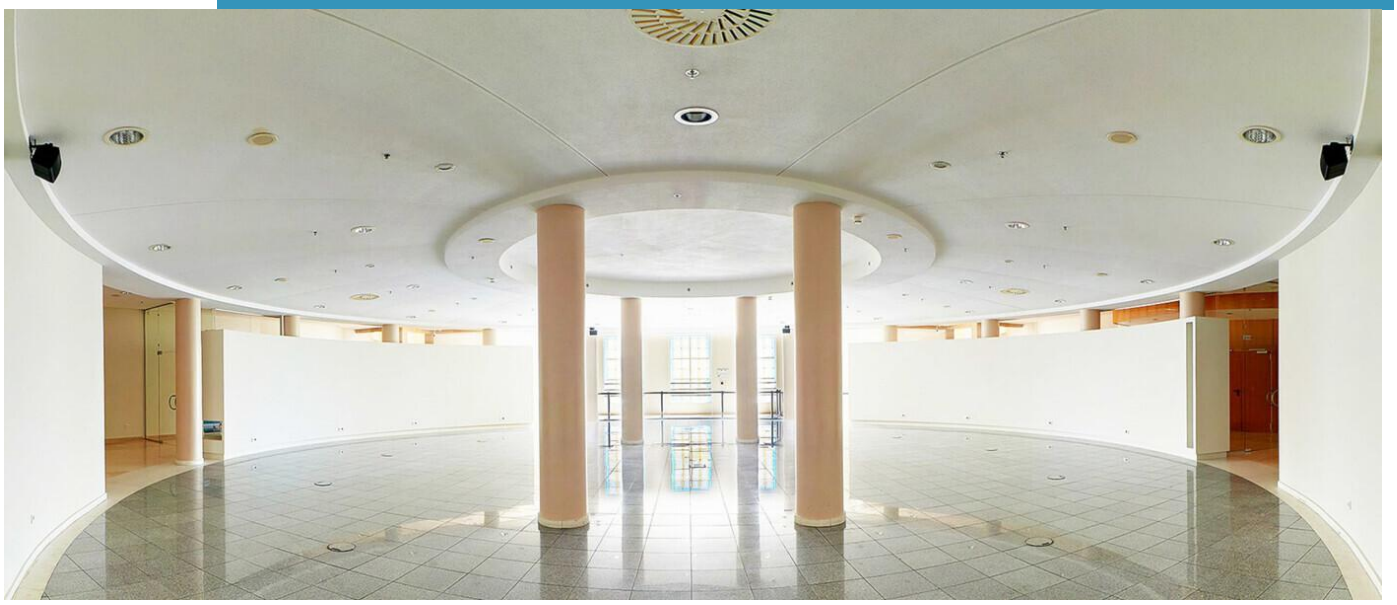
INVESTIGATION OF FLANK AND ROOT ACCURACY OF HOBBED GEARS THROGH CAD-BASED SIMULATION
Nikolaos Tapoglou

DESIGN AND OPTIMIZATION OF THE INFILL GEOMETRICAL PARAMETERS FOR 3D PRINTED SPUR GEARS
A. Mavridis-Tourgelis, G. Vasileiou, G. Kaisarlis, V. Spitas and C. Provatidis

REVERSE ENGINEERING OF LARGE INTERNAL GEAR BY THE COMBINED USE OF ARTICULATED ARM AND LASER TRACKER COORDINATE MEASURING SYSTEMS
G. Kaisarlis, K. Nikolitsas, T. Xenakis, V. Spitas

➢ 18:30

EVENING RECEPTION



2ND CONFERENCE DAY: THURSDAY JULY 10TH 2025

➢ **09:00**

MAIN SESSIONS

POLYMER GEARS | **CHAIRS: G.VASILEIOU, I. ATANASOVSKA**

COMPOSITE MATERIALS IN GEAR DESIGN
Tatjana M. Lazović, Miloš I. Sedak, Ivana D. Atanasovska

INFLUENCE OF GLASS AND CARBON FIBER REINFORCEMENT ON NYLON-6 GEAR PERFORMANCE
Mohit Jain, Victor Roda-Casanova, Santosh Patil

INVESTIGATION ON THE EFFECT OF FILLET RADIUS ON PERFORMANCE BEHAVIOUR OF ASYMMETRIC NYLON-6 GEAR
Mohit Jain, Victor Roda-Casanova, Santosh Patil

COMPARATIVE ANALYSIS OF DYNAMIC RESPONSE BETWEEN POLYMERIC AND METALLIC INVOLUTE GEARS USING LUMPED PARAMETER MODELS
Christos Papalexis, Christos Kalligeros, Panteleimon Tzouganakis, Konstantinos Orfanopoulos, Emmanouil Sakaridis, Antonios Tsolakis and Vasilios Spitas

➢ **10:30** **COFFEE BREAK**

➢ **11:00**

MAIN SESSIONS

ADDITIVE MANUFACTURING | **CHAIRS: K. STERGIOU, S. POLYDORAS**

INFLUENCE OF INFILL DENSITY ON THE TENSILE STRENGTH OF 3D-PRINTED PLA SPECIMENS
Milan S. Stojanović, Žarko Z. Mišković, Tatjana M. Lazović

CERAMIC GEAR RESEARCH BY THE UNNC-NTUA JOINT INTERNATIONAL LABORATORY ON ADVANCED VEHICLES AND POWERTRAINS (ILAVP)
Christos Kalligeros, Vasilios Spitas, Yinfeng He, Yi Nie, Kean-How Cheah, Dunant Halim, Jian Yang, Christos Spitas

EXPERIMENTAL STUDY ON THE CORRELATION OF PRINTING HEAD MOVEMENTS WITH VIBRATIONS LEVEL DURING FFF AM PROCESS
Ioannis T. Christodoulou, Nikolaos E. Karkalos, Angelos P. Markopoulos

EVALUATION OF SINTER BASED ADDITIVE MANUFACTURING METHODS IN THE FABRICATION OF DIES FOR COPPER CONTINUOUS EXTRUSION
Panagiotis Kontaktsis, Christos Papalexis, Christos Kalligeros, Dimitrios Kryfos, Panteleimon Tzouganakis, Eleftherios Havouzis, Nikolaos Petropoulos, Angelos Markopoulos, Antonios Tsolakis and Vasilios Spitas

3D PRINTED LINEAR PERISTALTIC PUMP BASED ON THE PRINCIPLES OF COMPLIANT MECHANISMS AND POWER TRANSMISSIONS: DESIGN AND MANUFACTURING
Vasileios Sarlis

CONSIDERATION OF CORE FUNCTIONAL REQUIREMENTS AND OPERATING RESTRICTIONS, AS CRITERIA FOR AM-CAPABLE LIGHTWEIGHTING OF COMPONENTS
Stamatios N. Polydoras, Vasileios A. Spitas, G. I. Vassileiou, Andreas F. Mavridis-Tourgelis

➢ **13:00 LUNCH BREAK**

➢ **14:00**

MAIN SESSIONS

TRIBOLOGY | **CHAIRS: P. NIKOLAKOPOULOS, N. ROGKAS**

EXPLOITING MACHINE LEARNING MODELS TO PREDICT CONTACT PRESSURE FOR FRETTING WEAR ASSESSMENT
Aikaterini A. Zampouni and Pantelis G. Nikolakopoulos

UNDERSTANDING THE ROLE OF AL-CUSN10 METAL POWDER IN ENHANCING MECHANICAL AND TRIBOLOGICAL PROPERTIES OF GLASS/CARBON FIBER REINFORCED POLYMER COMPOSITES.
H Jeevan Rao, Andrey Melnokov, Bakytzhan Sariyev, Andas Amrin, Amin Farakoh Abadi, Christos Spitas

CONCEPT, DESIGN AND EVALUATION OF MESO-SCALE SURFACE FEATURES FOR IMPROVED FRICTIONAL PERFORMANCE IN DISC BRAKE APPLICATIONS
Faidon Nousis, Nikolaos Rogkas, Vasilios Sagias, Constantinos Stergiou, Vasilios Spitas

➢ **15:00 COFFEE BREAK**

➢ **15:15**

MAIN SESSIONS

MATERIALS AND TECHNOLOGICAL PROCESSES | **CHAIRS:A. MARKOPOULOS, N. FOUNTAS**

EXPERIMENTAL STUDY ON THE MECHANICAL BEHAVIOR OF ADDITIVELY MANUFACTURED POLYMER RIVETS
Nikolaos A. Fountas, Nikolaos E. Karkalos, Nikolaos M. Vaxevanidis

PREDICTION OF DRILLING INDUCED DELAMINATION OF CARBON FIBER REINFORCED POLYMER MATRIX COMPOSITE
Bhanu Murthy Soppari, Kishore Nath Nayani, Ramesh Babu.P, A Chandrashekhar and H.Jeevan Rao

CONVERGENCE ANALYSIS OF 3D-PRINTED STOCHASTIC VORONOI STRUCTURES FOR BIOMEDICAL IMPLANTS: EFFECT OF REPRESENTATIVE VOLUME ELEMENT SIZE AND POROSITY
Panagiotis Ntakos, Christos Kalligeros, Vasilios Gakos, Dimitrios Krifos, Ioannis Christodoulou, Lefteris Havouzis, Michalis Bratsolias, Athanasios Foukas, Athanasios Armakolas, Olga Sawidou, Panayiotis Papagelopoulos, Angelos Markopoulos, Vasilios Spitas

DEVELOPMENT OF AN ALGORITHM FOR THE POSITIONING OF PARTS FOR THE EFFICIENT USE OF MOTORS BASED ON SPECIFIC FFF PRINTER KINEMATICS
Ioannis T. Christodoulou, Nikolaos E. Karkalos

THE EFFECT OF PLY OVERLAP ON MECHANICAL PROPERTIES OF COMPOSITE MATERIAL STRUCTURES
A. G. Kitselis

➢ **17:00** COFFEE BREAK

➢ **17:15**

MAIN SESSIONS

INDUSTRIAL APPLICATIONS	CHAIRS: D. MOUZAKIS, N. KATSIOTIS

CONCEPT AND DESIGN ASPECTS OF HIGH TEMPERATURE HEAT PUMPS IN THE EU-PROJECT SOLINDARITY
Enrico Jende, Panagiotis Stathopoulos, Varshil Dalal, Nikolaos Rogkas

ANALYSIS AND DESIGN OF A HYDROGEN FUEL TANK WITH CELLULAR STRUCTURE FOR THE AUTOMOTIVE INDUSTRY
A. Akrivosi, V. Spitas

DESIGN AND DEVELOPMENT OF A PROTOTYPE CONDITION MONITORING SYSTEM FOR LARGE GEAR PAIRS OPERATING UNDER HARSH ENVIRONMENTS.
P. Santaloglou, G. Vasileiou, V. Spitas

ADDITIVE MANUFACTURING TECHNOLOGY FOR UNMANNED AERIAL VEHICLES AND MISSILES: CHALLENGES, OPEN ISSUES AND LIMITATIONS
Dionysios E. Mouzakis, Ilias E. Panagiotopoulos

➢ **18:30** END OF 2ND CONFERENCE DAY

3RD CONFERENCE DAY: FRIDAY JULY 11TH 2025

➢ **09:00**

MAIN SESSIONS

EDUCATION | **CHAIRS: P. ZALIMIDIS, D. MOMCILOVIC**

INTEGRATING AI SYSTEMS INTO ENGINEERING ESSAYS. EXPLORING ETHICAL AND PEDAGOGICAL IMPLICATIONS IN THE CONTEXT OF A COURSE ON POWER TRANSMISSIONS
P.Zalimidis, C.Sfyrakis, I.Iliopoulos

THE PROSPECT OF GENERATIVE AI IN ASSISTING THE CREATION OF LABORATORY EXERCISES IN POWER TRANSMISSIONS
Ioannis P. Iliopoulos, Christina Panagiotakopoulou

THE USE OF AI TOOLS IN TEACHING "MOTION AND TRANSPORT SYSTEMS
Christina Panagiotakopoulou, Justo García-Sanz-Calcedo, Ioannis Iliopoulos

CONTEMPORARY APPROACHES IN ENGINEERING EDUCATION: INTEGRATING LARGE LANGUAGE MODELS TO FOSTER INQUIRY-BASED LEARNING THROUGH THE STUDY OF GEARS
Chr. A. Sfyrakis, Iosif Fragkoulis

ENHANCING CONCEPTUAL MASTERY OF BEVEL GEARS THROUGH A FLIPPED CLASSROOM APPROACH AND AI-ASSISTED COURSE DESIGN IN ENGINEERING EDUCATION
P.Zalimidis, C.Sfyrakis, C.Panagiotakopoulou

➢ **10:45** **COFFEE BREAK**

➢ **11:00**

MAIN SESSIONS

SUSTAINABILITY | **CHAIRS: Z. KANETAKI, J. RAO**

DEVELOPMENT AND PERFORMANCE EVALUATION OF SELF-HEALING FLAX/GLASS/CARBON/SISAL HYBRID EPOXY COMPOSITES FOR SUSTAINABLE INDUSTRY
Mohit Kumar, Sumit Sharma,Bakytzhan Sariyev, Andrey Melnikov, Andas Amrin,Sanjay Singh, Amin Farrokhabadi, H Jeevan Rao, Christos Spitas

FUEL CONVERSION ANALYSIS OF A FOUR-STROKE MARINE DIESEL ENGINE USING COMBUSTION MODELS
Spyridon G. Didaskalou, Antonios D. Kourantis, Pantelis G. Nikolakopoulos

INSTALLATION OF AN ENVIRONMENTALLY SUSTAINABLE BALLAST WATER TREATMENT SYSTEM IN EXISTING OCEAN-GOING VESSEL USING A 3D LASER POINT SCANNING
Zoe Kanetaki, Giakouvakis Athanasios, Panagiotis Karvounis, Gerasimos Theotokatos, Evangelos Boulougouris, Konstantinos Sofias, Constantinos Stergiou and Sebastian Jacques

➢ **13:00** **CONCLUDING REMARKS AND CONFERENCE ASSESSMENT**

Dr. Vasilios Spitas
President of BAPT, Vice Dean School of Mechanical Engineering, NTUA, Athens, Greece

ACKNOWLEDGEMENTS

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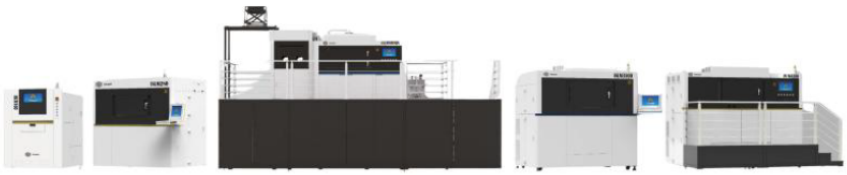
Our adaptable 3D printers serve both industrial and research needs.
We envision a future where 3D printers integrate seamlessly into production lines,
powered by machine vision and AI—an evolution our R&D team is driving.

Our Business Units

3D Printing: Active in AM since 2009, our largest unit delivers end-to-end solutions—from design software to industrial 3D printers and part production—enabling efficient, advanced manufacturing.
R&D: We focus on developing proprietary technologies, with initiatives like the EU RoBetArme Project highlighting our commitment to innovation in additive manufacturing.
Design Software: Since 1991, we've offered design and design management solutions that streamline business processes with proven technologies.



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