



BIOMAT Consortium

**I³MBS - INTERNATIONAL INSTITUTE FOR INTERDISCIPLINARY
MATHEMATICAL AND BIOLOGICAL SCIENCES**

BIOMAT 2024

24TH BIOMAT INTERNATIONAL SYMPOSIUM

October 27 – November 01, 2024

BIOMAT 2024 INTERNATIONAL SYMPOSIUM / SCIENTIFIC PROGRAMME

KT = KEYNOTE TALK / CT = CONTRIBUTED TALK

BIOMAT 2024	Monday October 28	Tuesday October 29	Wednesday October 30	Thursday October 31
07:30am – 08:30am	BREAKFAST			
09:00am – 09:30am		KT4 PRASHANT	KT9 SAMARES PAL	KT14 RÖST
09:30am – 10:00am				
10:00am – 10:15am				
10:15am – 10:30am	OPENING SESSION PRES. BIOMAT CONSORTIUM	CT3 ZAKARIA	CT6 KIPTOO KORIR	KT15 VENTURINO
10:30am – 10:45am	KT1 DRAGOVICH	CT4 GYURÓ-MAGYÁR	CT7 CSUMA-KOVÁCS	
10:45am – 11:00am				
11:00am – 11:15am				
11:15am – 11:30pm				
11:30am – 12:00pm	CT1 MONDAINI	KT5 MADDALENA	KT10 SOMDATTA SINHA	KT16 LEFRAICH
12:00pm – 01:15pm	LUNCH			
01:30pm – 02:00pm	KT2 SUDESHNA SINHA	KT6 BAIRAGI	KT11 ALLALI	KT17 KOVÁCS
02:00pm – 02:30pm				
02:30pm – 03:00pm	KT3 CONGJIE SHI	CT5 BOUKHRISSI	CT8 EL YOUNOUSSI	CT10 ASSADIKI
03:00pm – 03:30pm				CT11 CHOLO CAMARGO
03:30pm – 04:00pm	CT2 IBRAHIM NALI	KT7 CARFORA	KT12 STACEY SMITH?	CT12 ALBUQUERQUE
04:00pm – 04:30pm	COFFEE BREAK			
04:30pm – 05:00pm		KT8 DÉNES	KT13 PARDALOS	KT18 HEFFERNAN
05:00pm – 05:30pm				
05:30pm – 06:00pm		BIOMAT CONSORTIUM GENERAL ASSEMBLY	CT9 FAZEKAS	CLOSING SESSION
06:00pm – 06:30pm			DIRECTOR BOARD MEETING	

**BIOMAT 2024 INTERNATIONAL SYMPOSIUM
SCIENTIFIC PROGRAMME**

The Speaker's name and Affiliation are in Bold and Underlined Type

KT = Keynote Talk / CT = Contributed Talk

Oct 28, Monday, 10:15 am – 10:30 am

OPENING SESSION

Oct 28, Monday, 10:30 am - 12:00 pm– 1st Session

10:30 am – 11:30 am – KT1– “FROM PHYSICAL TO BIOLOGICAL INFORMATION AND THE GENETIC CODE”- Branko Dragovich – Institute of Physics, University of Belgrade; Mathematical Institute of the Serbian Academy of Sciences and Arts, Belgrade, Serbia

11:30:am –12:00 pm - CT1 - “THE EVOLUTION OF PROBABILITIES OF OCCURRENCE ACCORDING TO SYNERGETIC PATTERNS OF HELMHOLTZ FREE ENERGY”- R. Mondaini; S. C. Albuquerque Neto, Federal University of Rio de Janeiro, Brazil

Chair: Lucia Maddalena

Oct 28, Monday, 01:30 pm – 04:00 pm – 2nd Session

01:30 pm - 02:30 pm - KT2– “EXTREME EVENTS IN BIOLOGICAL SYSTEMS” - Sudeshna Sinha - Indian Institute of Science Education and Research, Mohali, Punjab, India

Chair: Rubem Mondaini

Oct 28, Monday, 02:30 pm – 04:00 pm - 3rd Session

02:30 pm – 03:30 pm – KT3 - “INTEGRATING INFORMATION AND BEHAVIOUR IN EPIDEMIC DYNAMICS: A THREE-LAYER NETWORK APPROACH”- Congjie Shi, Seyed Moghadas - Agent-Based Modelling Laboratory, York University, Ontario, Canada; Silvio C. Ferreira, Federal

University of Viçosa, MG, Brazil

03:30 pm – 04:00 pm – CT2 - “BLOCKING TUMOR GROWTH THROUGH LOCALIZED RADIATION THERAPY - Ibrahim Nali, Attila Dénes, Abdessamad Tridane - Bolyai Institute, University of Szeged, Hungary

Chair: Branko Dragovich

Oct 29, Tuesday, 09:00 am – 10:30 am - 4th Session

09:00 am – 10:00 am– KT4 – “DYNAMICAL ANALYSIS OF HIV INFECTION MODEL WITH IMMUNE IMPAIRMENT” – Surya Prakash, Anuj Kumar Umrao, Prashant K. Srivastava – Indian Institute of Technology Patna, India

10:00 am – 10:30 am – CT3– “SPATIOTEMPORAL DYNAMICS OF MATHEMATICAL HIV-1 INFECTION MODEL WITH HATTAF TIME FRACTIONAL DERIVATIVE AND TWO TYPES OF INFECTED CELLS”- Zakaria Hajhouji, H. El Mamouni, N. Yousfi – Hassan II University of Casablanca, Morocco

Chair: Samares Pal

Oct 29 , Tuesday – 10:30 am – 12:00 pm – 5th Session

10:30 am - 11:00 am – CT4 – –“DYNAMICAL ANALYSIS OF A DISCRETIZED SYSTEM MODELLING SOMITOGENESIS” – Sándor Kovács, Department of Numerical Analysis, Eötvös Loránd University, Budapest, Hungary; Noémi Gyúró-Magyar – Eötvös Loránd University, Budapest, Hungary

11:00 am – 12:00 pm - KT5 – “MACHINE LEARNING AND ARTIFICIAL INTELLIGENCE FOR CELL BIOLOGY IMAGING” – L. Maddalena, L. Antonelli, National Research Council , Institute for High-Performance Computing and Networking, Naples; F. Polverino, I. A. Asteriti, F. Degrassi, G. Guarguaglini, National Research Council, Institute of Molecular Biology and Pathology, Rome ; A. Albu, A. Hada, M.R. Guarracino, University of Cassino and Southern Lazio, Cassino, Italy.

Chair: Somdatta Sinha

Oct 29, Tuesday – 01:30 pm - 03:00 pm – 6th Session

01:30 pm – 02:30 pm – KT6 - “SPATIOTEMPORAL INSTABILITIES AND PATTERN-FORMING PHENOMENA IN HYPERBOLIC REACTION-DIFFUSION PREDATOR-PREY SYSTEM”- S. Bhattacharya, N. Bairagi – Centre for Mathematical Biology and Ecology, Department of Mathematics, Jadavpur University, Kolkata, India.

02:30 pm – 03:00 pm – CT5 – “STABILITY OF A DELAYED FUNCTIONAL MODEL FOR VIRAL INFECTION WITH MULTIPLE MODES OF TRANSMISSION AND HUMORAL IMMUNITY”- Hanae Boukhrissi, Fatima Assadiki, K. Hattaf, F. Lahmidi, Hassan II University of Casablanca, Morocco

Chair: Lucia Maddalena

Oct 29, Tuesday – 03:00 pm – 04:00 pm – 7th Session

03:00 pm – 04:00 pm – KT7 – “ STOCHASTIC MODELS OF NEURONAL DYNAMICS: FRACTIONAL TIME-CHANGED PROCESSES AND SIMULATION STRATEGIES FOR THEIR FIRST PASSAGE TIMES” –Maria Francesca Carfora - Istituto per le Applicazioni del Calcolo “Mauro Picone”, Naples, Italy.

04:00 pm - 04:30 pm - COFFEE BREAK

04:30 pm – 05:30 pm – KT8 – “GLOBAL STABILITY IN AN SIRS MODEL WITH ZOONOTIC TRANSMISSION, NONLINEAR INCIDENCE RATE AND TEMPORARY IMMUNITY“ – Saumem Barua, Gachbharja Government College, Chattogram, Bangladesh, Attila Dénes, University of Szeged, Hungary.

Chair: Sandór Kovács

Oct 29, Tuesday – 05:30pm – 06:30 pm

BIOMAT CONSORTIUM GENERAL ASSEMBLY

Oct 30, Wednesday - 09:00am – 10:30 am - 8th Session

09:00 am – 10:00 am – KT9 - “A GENERALIST PREDATOR – BASED ECOEPIDEMIC MODEL FOR THE CONSEQUENCES OF SELECTIVE PREDATION AND HARVESTING” – Sasanka Shekhar Maity, Samares Pal – Department of Mathematics, University of Kalyani, India

10:00 am – 10:30 am – CT6 – “SENSITIVITY ANALYSIS OF COVID-19 TRANSMISSION DYNAMICS IN HUNGARY: UNDERSTANDING INFECTION

ACQUISITION PATTERNS” – Evans Kiptoo Korir, Zsolt Vizi – University of Szeged, Hungary

Chair: Sudeshna Sinha

Oct 30, Wednesday – 10:30 am – 12:00 pm – 9th Session

10:30 am – 11:00 am – CT7 – “THE MATHEMATICAL ANALYSIS OF TRANSMISSION DYNAMICS OF VARICELLA” - Rita Csuma-Kovács, Gergely Röst – University of Szeged, Hungary

11:00 am – 12:00 pm – KT10 – “MODELLING THREE-DIMENSIONAL STRUCTURES OF PROTEINS USING NETWORKS” – Somdatta Sinha – INSA Honorary Senior Scientist, ISER Kolkata, Mohanpur, West Bengal, India

Chair : Prashant Srivastava

Oct 30, Wednesday – 01:30 pm – 04:00 pm – 10th Session

01:30 pm – 02:30 pm – KT11 – “MODELING AND OPTIMAL CONTROL OF MONKEYPOX DISEASE WITH SATURATED INCIDENCE RATES”- Karam Allali – Hassan II University, Mohammedia, Morocco

02:30 pm – 03:00 pm – CT8 - “EXPLORING THE STABILITY AND DYNAMICS OF CANCER VIROTHERAPY: A FRACTIONAL CALCULUS APPROACH WITH GHF DERIVATIVE”- Majda El Younoussi, Khalid Hattaf, Noura Yousfi – Hassan II University, Casablanca, Morocco

Chair: Gergely Röst

Oct 30, Wednesday - 03:00 pm – 04:00 pm - 11th Session

03:00 pm – 04:00 pm – KT12 – “COULD COVID-19 MASK AND VACCINE MANDATES HAVE MADE A DIFFERENCE IF THEY WERE ROLLED OUT EARLIER?”- Stacey Smith ? – University of Ottawa, Canada

Chair: Congjie Shi

Oct 30, Wednesday - 04:30 pm – 06:00 pm – 12th Session

04:30 pm – 05:30 pm – KT13 – “AI AND DATA SCIENCES FOR SLEEP DISORDERS”- Panos Pardalos – University of Florida, Gainesville, USA

05:30 pm – 06:00 pm – CT9 – “QUEST FOR A CLINICALLY RELEVANT MEDICAL IMAGE SEGMENTATION METRIC: THE DEFINITION AND IMPLEMENTATION OF MEDICAL SIMILARITY INDEX”- **Szuzina Fazekas**
Semmelweis University, Budapest, Hungary

Chair: Karam Allali

Oct 30, Wednesday - 06:00 pm – 06:30 pm

DIRECTOR BOARD MEETING

Oct 31, Thursday - 09:00 am – 11:00 am – 13th Session

09:00 am – 10:00 am – KT14 - “HYBRID APPROACH FOR MODELLING VIRAL INFECTIONS “ – **Gergely Röst - Bolyai Institute, University of Szeged, Hungary**

10:00 am – 11:00am – KT15 - “ INVESTIGATING THE SPREAD OF CHYTRIDIOMYCOSIS IN NATIVE AMPHIBIANS BY INVADING BD-CARRIER BULLFROGS” – Francesca Acotto, Maria Elisa Ancona, Samuele Conticelli, Giulia Petrella, **Ezio Venturino, Department of Mathematics “Giuseppe Peano”, University of Turin, Italy;** Alberto Viscardi, Université de Franche-Comté, France.

Chair: Stacey Smith ?

Oct 31, Thursday - 11:00 am – 12:00 am – 14th Session

11:00 am – 12:00 pm – KT16 – “ A COMPUTATIONAL REACTION-DIFFUSION MODEL FOR BIDOMAIN CALCIUM DYNAMICS IN CARDIAC CELLS “ – **Hamid Lefraich – University Hassan First, Casablanca Road, Settat, Morocco**

Chair: Ezio Venturino

Oct 31, Thursday - 01:30 pm – 03:00 pm – 15th Session

01:30 pm – 02:30 pm - KT17 – “ DYNAMICAL PROPERTIES OF A SEASONALLY FORCED PHYTOPLANKTON-ZOOPLANKTON MODEL” - **Sándor Kovács, Szilvia György - Department of Numerical Analysis, Eötvös Loránd University, Budapest, Hungary**

02:30 pm – 03:00 pm – CT10 – “GLOBAL STABILITY WITH HATTAF TIME FRACTIONAL DERIVATIVE AND SOME APPLICATIONS IN MATHEMATICAL

BIOLOGY” – Fatima Assadiki, Noura Yousfi, LAMS , Hassan II University of Casablanca, Ahmed Delbough CRMEF, Dakhla-Oued Eddahab, Khalid Hattaf, CRMEF, Derb Ghalef, Morocco

Chair: Hamid Lefraich

Oct 31, Thursday - 03:00 pm – 04:00 pm – 16th Session

03:00 pm - 03:30pm – CT11 - “MAXIMAL UTILITY AND OPTIMAL NUMBER OF WORKERS IN AN AGROFORESTRY SYSTEM WITH MINIMAL FOREST RESERVE” – Ingrid Milena Cholo Camargo, National University of Colombia, Manizales, Colombia

03:30 pm – 04:00 pm – CT12 - EXAMPLES OF COMPARISON OF SYNERGETIC AND NON-SYNERGETIC EVOLUTIONS OF SELECTED PROTEIN DOMAIN FAMILIES – R.P. Mondaini, S. C. de Albuquerque Neto – Federal University of Rio de Janeiro, Brazil

Chair: Attila Dénes

Oct 31, Thursday - 04:30 pm – 05:30 pm – 17th Session

**04:30 pm – 05:30 pm – KT18 – “MODELLING INFECTION WAVES”
Jane M. Heffernan, University of York, Canada**

Chair: R. Mondaini

Oct 31, Thursday – 05:30 pm – 06:00 pm

CLOSING SESSION