Program (June 26, 2024) There are some minor changes from the previous version, please check
MONDAY 24 JUNE

Registrations are in the office room starting at 8:30 until 10:00 and during the Lunch hours

10:00-10:30 Opening Ceremony Plenary Room (to access via Zoom CTRL+click **here** and use passcode **095007**)

Thomas Michelischt Chair of the organizing committee of ICDEA 2024

Laura Gardini President of ISDE

10:30-11:30 **Soumitro Banerjee** (Chair Iryna Sushko) Plenary Room

Bifurcations of tori

11:30-12:30 **Guanrong (Ron) Chen** (Chair René Lozi) Plenary Room

Chaos in a Finite-Dimensional Linear System with Weak Topology

12:30-13:50 Lunch, Change of room configuration

13:50-15:55 Room A (to access via Zoom CTRL+click **here** and use passcode **344192**)	13:50-15:55 Room B (to access via Zoom CTRL+click **here** and use passcode **587757**)	13:50-15:55 Room C (to access via Zoom CTRL+click **here** and use passcode **045343**) **Regular Session**
Special Session 1: Elena Braverman: On connections between differential, delay differential and difference equations, difference models of population dynamics and stochastic effects,	**Special Session 7: Adina Luminița Sasu and Weinian Zhang:** Stability and Bifurcation of Dynamical Systems	
Chair: Elena Braverman	Chair: Adina Luminița Sasu	Chair: Guanrong (Ron) Chen
13:50-14:15 Thomas Michelitsch	13:50-14:15 Weinian Zhang (online)	13:50-14:15 Gizem Seyhan Oztepe
14:15-14:40 Alejandro Riascos	14:15-14:40 Davor Dragičević (online)	14:15-14:40 Arzu Unal
14:40-15:05 Juan Segura	14:40-15:05 Mihály Pituk	14:40-15:05 Daniel Nieves Roldan,
15:05-15:30 Emmett Lawless	15:05-15:30 Christopher Townsend	15:05-15:30 Dumani Phindile
15:30-15:55 Islam Boussaada	15:30-15:55 Beniamin Bogosel	15:30-15:55 Kalyan Das

15:55-16:20 Coffee Break

16:20-18:50 Room A	16:20-18:50 Room B	16:20-18:50 Room C
Special Session 6: Bo Zheng, Jianshe Yu, Jia Li, Hongpeng Guo: Discrete Dynamical Systems and Applications in Mathematical Biology	**Special Session 3: Davide Radi, Iryna Sushko:** Bifurcations in Smooth and Nonsmooth Maps: Theory and Applications	**Regular Session**
Chair: Bo Zheng		
16:20-16:45 Saber Elaydi	Chair: Wirot Tikjha	Chair: Soumitro Banerjee
16:45-17:10 Susan Trolle	16:20-16:45 Gian Italo Bischi	16:20-16:45 Armen Bagdasaryan (online)
17:10-17:35 Zhan Zhou	16:45-17:10 Jochen Jungeilges	16:45-17:10 Anurag Shukla
Chair: Zhan Zhou	17:10-17:35 Tatyana Perevalova	17:10-17:35 Katarzyna Topolewicz (online)
17:35-18:00 Bo Zheng	17:35-18:00 Pasquale Commendatore (online)	17:35-18:00 Assia Guezane Lakoud
18:00-18:25 Hongpeng Guo	18:00-18:25 Ilaria Foroni	18:00-18:25 Henrique Olivera (online)
18:25-18:50 Amy Veprauskas (moved on 27)	18:25-18:50 Nicolo Pecora	18:25-18:50 Nouressadat Touafek (online)

TUESDAY 25 JUNE

Registrations are in the office room starting at 8:30 until 10:00 and during the Lunch hours	

9:00-10:00 **Victor Manosa** (Chair Iryna Sushko) Plenary Room (to access via Zoom CTRL+click **here** and use passcode **095007**)
Invariant graphs and dynamics in a family of piecewise linear maps

10:00-11:00 **Iryna Sushko** (Chair Thomas Michelischt) Plenary Room
Discontinuous maps and their applications: Exploring the bifurcation structures

11:00-12:00 **Jim Cushing** (Chair Saber Elaydi) Plenary Room
Discrete-time Darwinian Dynamics

12:00-13:35 Lunch, Change of room configuration

13:35-16:05 Room A (to access via Zoom CTRL+click **here** and use passcode **344192**)	13:35-16:05 Room B (to access via Zoom CTRL+click **here** and use passcode **587757**)	13:35-16:05 Room C (to access via Zoom CTRL+click **here** and use passcode **045343**)
Special Session 4: Tom Cuchta, Jaqueline Godoy Mesquita, Sabrina Streipert: Recent advances on time scales and its relation to difference equations Chair: Jaqueline Godoy Mesquita 13:35-14:00 Mustafa Kulenovic 14:00-14:25 Masakazu Onitsuka 14:25-14:50 Hideaki Matsunaga 14:50-15:15 Tri Truong 15:15-15:40 Ewa Girejko 15:40-16:05 Tom Cuchta	**Special Session 3: Davide Radi, Iryna Sushko** Bifurcations in Smooth and Nonsmooth Maps: Theory and Applications Chair: Tatyana Perevalova 13:35-14:00 Zhanybai Zhusubaliyev (online) 14:00-14:25 Davide Radi 14:25-14:50 Anastasiia Panchuk (online) **Special Session 2: Alexey Kazakov, Dmitry Sinelshchikov, Nataliya Stankevich:** Multidimensional chaos: formation, control and its application Chair: Alexey Kazakov 14:50-15:15 Alexey Kazakov 15:15-15:40 Arturo Vieiro 15:40-16:05 Ainoa Murillo	**Regular Session** Chair: Saber Elaydi 13:35-14:00 Anushaya Mohapatra (online) 14:00-14:25 Abdelkader Lakmeche 14:25-14:50 Mohamed Helal 14:50-15:15 Rasha Samarah 15:15-15:40 Abdelrahim Mousa 15:40-16:05 Marc Chamberland

16:05-16:30 Coffee Break

16:30-18:35 Room A	16:30-18:35 Room B	16:30-18:35 Room C
Special Session 1: Elena Braverman: On connections between differential, delay differential and difference equations, difference models of population dynamics and stochastic effects Chair: Elena Braverman 16:30-16:55 Yun Kang 16:55-17:20 Gail Wolkowicz 17:20-17:45 Sabrina H. Streipert 17:45-18:10 John Stavroulakis 18:10-18:35 Jehad Alzabut	**Special Session 2: Alexey Kazakov, Dmitry Sinelshchikov, Nataliya Stankevich:** Multidimensional chaos: formation, control and its application Chair: Nataliya Stankevich 16:30-16:55 Nataliya Stankevich 16:55-17:20 Christophe Letellier 17:20-17:45 Efrosiniya Karatetskaya 17:45-18:10 Sofia Rumyantseva 18:10-18:35 Dmitry Sinelshchikov (online)	**Regular Session** Chair: Peter Kloeden 16:30-16:55 Magdalena Nockowska-Rosiak 16:55-17:20 Hartung Ferenc 17:20-17:45 Vladimir Svigler 17:45-18:10 Sangeeta Dhawan 18:10-18:35 Zbigniew Leśniak (online)

WEDNESDAY 26 JUNE

Registrations are in the office room starting at 8:30 until 10:00 and during the Lunch hours	

9:00-10:00 **Peter Kloeden** (Chair René Lozi) Plenary Room (to access via Zoom CTRL+click **here** and use passcode **095007**)
Spatial discretisation of dynamical systems

10:00-10:30 **Amina Eladdadi** (Chair Saber Elaydi) Plenary Room
The U.S. National Science Foundation (NSF) Program Director

10:30-11:30 **ISDE General meeting**   Plenary Room

11:30-12:50 Lunch, Change of room configuration

12:50-14:55 Room A	12:50-15:20 Room B	12:50-15:45 Room C
Special Session 6: Bo Zheng, Jianshe Yu, Jia Li, Hongpeng Guo: Discrete Dynamical Systems and Applications in Mathematical Biology	**Special Session 7: Adina Luminiţa Sasu and Weinian Zhang:** Stability and Bifurcation of Dynamical Systems	**Regular Session**
Chair Linchao Hu	Chair Weinian Zhang	
12:50-13:15 Huafeng Xiao	12:50-13:15 Wenmeng Zhang (online)	Chair: Thomas Michelitsch
13:15-13:40 Zhongcai Zhu	13:15-13:40 Linfeng Zhou (online)	12:50-13:15 Chaitanya Gopalakrishna (online)
13:40-14:05 Peng Mei	13:40-14:05 Jiyu Zhong (online)	13:15-13:40 Giriraj Methi (online)
Chair Hongling Zhou		13:40-14:05 Mansoor Saburov (online)
14:05-14:30 Yanshan Chen	Chair Adina Luminiţa Sasu	14:05-14:30 Sreelatha Chandragiri (online)
14:30-14:55 Azmy S. Ackleh (online)	14:05-14:30 César Silva (online)	14:30-14:55 Stephen Baigent
	14:30-14:55 Álvaro Castañeda	14:55-15:20 João Alves
14:55 -15:45 Room A	14:55-15:20 Néstor Jara	15:20-15:45 Ricardo López Ruiz
Special Session 4: Tom Cuchta, Jaqueline Godoy Mesquita, Sabrina Streipert: Recent advances on time scales and its relation to difference equations		
Chair: Tom Cuchta		
14:55-15:20 Antonin Slavik		
15:20-15:45 Maria Lusia Morgado		

15.45-16:20 Coffee Break

16:20-18:50 Room A	16:20-18:50 Room B	16:20-18:50 Room C
Special Session 3: Davide Radi, Iryna Sushko: Bifurcations in Smooth and Nonsmooth Maps: Theory and Applications	Special Session 5: **Paul Salceanu, Amy Veprauskas** Construction and Analysis of Discrete Dynamical Systems with Applications to Studying the Dynamics of Biological Populations	**Regular Session**
Chair: Jochen Jungeilges	Chair: Paul Salceanu	Chair: ViKtor Avrutin
16:20-16:45 Wirot Tikjha	16:20-16:45 Jim Cushing	16:20-16:45 Rafael Luís
16:45-17:10 Andrea Caravaggio	16:45-17:10 Yun Kang	16:45-17:10 Rebelo Magda
17:10-17:35 Inese Bula (online)	17:10-17:35 Eddy Kwessi	17:10-17:35 Luís Morgado
17:35-18:00 Fausto Cavalli (online)	17:35-18:00 Ziyad Al Shawari	17:35-18:00 Mourad Azioune (online)
18:00-18:25 Fabio Lamantia	18:00-18:25 John Banks	18:00-18:25 Rodica Luca Tudorache (online)
18:25-18:50 Mauro Sodini (online)	18:25-18:50 Azmy Ackleh (online)	18:25-18:50 Ibtissem Redjam (online)

THURSDAY 27 JUNE

9:00-10:00 **Viktor Avrutin** (Chair Laura Gardini) Plenary Room (to access via Zoom CTRL+click **here** and use passcode **095007**)
Chaotic Attractors and their Bifurcations in 1D and 2D maps

10:00-11:00 **Adina Sasu** (Chair René Lozi) Plenary Room
Admissibility and Asymptotic Behaviors of Dynamical Systems: from Global Methods to Ergodic Theory Approaches

11:00-12:00 **Best Paper award JDEA** (Chair Saber Elaydi) Plenary Room
The name of the recipient was announced during the ISDE General meeting

12:00-13:35 Lunch, Change of room configuration

13:35-14:50 Room A (to access via Zoom CTRL+click here and use passcode 344192)	13:35-16:05 Room B (to access via Zoom CTRL+click here and use passcode 587757)	13:35-16:05 Room C (to access via Zoom CTRL+click here and use passcode 045343)
Special Session 5: Paul Salceanu, Amy Veprauskas: Construction and Analysis of Discrete Dynamical Systems with Applications to Studying the Dynamics of Biological Populations	**Special Session 6: Bo Zheng, Jianshe Yu, Jia Li, Hongpeng Guo**: Discrete Dynamical Systems and Applications in Mathematical Biology	**Special Session 4: Tom Cuchta, Jaqueline Godoy Mesquita, Sabrina Streipert:** Recent advances on time scales and its relation to difference equations
Chair: Paul Salceanu 13:35-14:00 Saber Elaydi 14:00-14:25 Gail Wolkowicz 14:25-14:50 Jude Kong (online)	Chair: Huafeng Xiao 13:35-14:00 Kai Wang 14:00-14:25 Hongling Zhou Chair: Hongpeng Guo 14:25-14:50 Linchao Hu 14:50-15:15 Jose S. Canovas (online) 15:15-15:40 Fangfang Liao 15:40-16:05 Amy Veprauskas (online)	Chair: Sabrina Streipert 13:35-14:00 Ozkan Ozturk 14:00-14:25 Douglas Anderson 14:25-14:50 Arun Kumar Tripathy 14:50-15:15 Alexander Lyapin 15:15-15:40 Petr Zemanek 15:40-16:05 Aldo Pereira
14:50-16:00 Room A **Special Session 7: Adina Luminiţa Sasu and Weinian Zhang**: Stability and Bifurcation of Dynamical Systems Chair Davor Dragičević 14:50-15:15 Thorsten Hüls (online) 15:15-15:40 Wolf-Jürgen Beyn (online) 15:40-16:05 Laurian Suciu (online)		

16:05-16:30 Coffee Break

16:30-18:35 Room A	16:30-18:35 Room B Regular Session	16:30-18:35 Room C Regular Session
Special Session 7: Adina Luminiţa Sasu and Weinian Zhang: Stability and Bifurcation of Dynamical Systems Chair Bogdan Sasu 16:30-16:55 Liviu Cădariu-Brăiloiu 16:55-17:20 Nicolae Lupa 17:20-17:45 Oana Brandibur Chair Adina Luminiţa Sasu 17:45-18:10 Loredana Culda 18:10-18:35 Ana Șirianțu (online)	Chair: Victor Mañosa 16:30-16:55 Yacine Halim (online) 16:55-17:20 Naeem Alkoumi (online) 17:20-17:45 Anshul Sharma (online) 17:45-18:10 18:10-18:35	Chair: Laura Gardini 16:30-16:55 Sishu hankar Muni (online) 16:55-17:20 Kalifa Amira (online 17:20-17:45 17:45-18:10 18:10-18:35 Total 41 regular speakers

FRIDAY 28 JUNE

9:00-10:00 **Martin Bohner** (Chair Elena Braverman) Plenary Room (to access via Zoom CTRL+click **here** and use passcode **095007**) The Beverton–Holt Equation
10:00-11:00 **Agnieszka Malinowska** (Chair Adina Sasu) Plenary Room Consensus in Fractional-Order Systems and Systems Defined on Time Scales
11:00-12:00 **Elena Braverman** (Chair Martin Bohner) Plenary Room From continuous delayed differential systems to discrete models: can stochastic perturbations improve control outcome for difference equations?
12:00-13:00 **Maia Martcheva** (Chair Mustafa Kulenovic) Plenary Room (online) Hybrid Discrete-Continuous Epidemic Models
13:00-14:00 **Closing Ceremony**   Plenary Room
14:00-15:25 Lunch

For virtual participation, the Zoom platform is used. See instructions below to connect via Zoom to one of the four classrooms (Plenary Room, Room A, Room B and Room C).

Below, the list of Zoom virtual rooms, to access one of this virtual rooms, please copy and paste the link into the browser, then use the passcode to enter.

ICDEA 2024 - Plenary Room

ID Meeting: 837 4899 2232

Passcode: 095007

Link to enter the room: https://uniurb-it.zoom.us/j/83748992232?pwd=Qj0GJj2E3fnfaFkgzulIXZ2genfM31.1

ICDEA 2024 - Room A

ID meeting: 840 5504 4007

Passcode: 344192

Link to enter the room: https://uniurb-it.zoom.us/j/84055044007?pwd=qNzs9c9dzbM9X9muNeg83Tf5LQWFhI.1

ICDEA 2024 - Room B

Meeting ID: 853 9635 8461

Passcode: 356824

Link to enter the room: https://uniurb-it.zoom.us/j/85396358461?pwd=a5SW7Yps4w1o5uKmIGZAjvQLt3hclI.1

ICDEA 2024 - Room C

ID meeting: 832 2558 5863

Passcode: 045343

Link to enter the room: https://uniurb-it.zoom.us/j/83225585863?pwd=IRaLjLYvwjKNaV6tKJCKfwcmhaGpP9.1

ICDEA 2024-Detailed Program (June 26, 2024)

Monday 24 June 10:00-14:00

10:00-10:30 Opening Ceremony

Thomas Michelischt Chair of the organizing committee of ICDEA 2024

Laura Gardini President of ISDE

10:30-11:30 *Soumitro Banerjee* (Chair Iryna Sushko)

Bifurcations of tori

11:30-12:30 *Guanrong (Ron) Chen* (Chair René Lozi)

Chaos in Finite-Dimensional Linear Systems with Weak Topology

<mark>12:30-13:50 Lunch, Change of room configuration</mark>

Monday 24 June 13:50-15:55

Room A   Special Session 1: On connections between differential, delay differential and difference equations, difference models of population dynamics and stochastic effects

Organizer: Elena Braverman

Chair: Elena Braverman

13:50-14:15 *Thomas Michelitsch:* From discrete random walks to epidemic spreading in complex networks with mortality

14:15-14:40 *Alejandro Riascos:* Fractional diffusion on networks

14:40-15:05 *Juan Segura:* The combined effect of dispersal, asymmetry, and local dynamics on the asymptotic total population size

15:05-15:30 *Emmett Lawless:* Solution space characterization of perturbed stochastic Volterra integrodifferential equations

15:30-15:55 *Islam Boussaada:* Continuous-time difference equation with two interfering delays: Prescribed stabilization of some hyperbolic PDE's

Room B   Special Session 7: Stability and Bifurcation of Dynamical Systems

Organizers: Adina Luminița Sasu and Weinian Zhang

Chair: Adina Luminița Sasu

13:50-14:15 *Weinian Zhang:* Approximate Boundaries of Arnold Tongue

14:15-14:40 *Davor Dragičević:* Dichotomies for Triangular Systems via Admissibility

14:40-15:05 *Mihály Pituk:* Shadowing and Hyperbolicity for Linear Delay Difference Equations

15:05-15:30 *Christopher Townsend:* Robust Invariant Sets for Systems Affected by State-Dependent Disturbances

15:30-15:55 *Beniamin Bogosel:* Discrete algorithms for approximating spectral optimal partitions

Room C   Regular Session

Chair: Guanrong (Ron) Chen

13:50-14:15 *Gizem Seyhan Oztepe:* Complex Behaviors of a Predator-Prey Model Discretized by Piecewise Constant Arguments

14:15-14:40 *Arzu Unal:* A Discrete SEIRS model for the COVID-19

14:40-15:05 *Daniel Nieves Roldan:* A generalized Beddington host-parasitoid model with an arbitrary parasitism escape function

15:05-15:30 *Dumani Phindile:* Nonstandard finite difference method for a microbial population model incorporating environmental stress

15:30-15:55 *Kalyan Das:* A Discrete Smoking Disease Model with Impact of Media and Awareness

15:55-16:20 Coffee Break

Monday 24 June 16:30-19:00

Room A   Special Session 6: Discrete Dynamical Systems and Applications in Mathematical Biology

Organizers: Bo Zheng, Jianshe Yu, Jia Li, Hongpeng Guo

Chair: Bo Zheng

16:20-16:45 *Saber Elaydi:* Discrete Mathematical Models of Tuberculosis

16:45-17:10 *Susan Trolle:* Stability and evolutionary stability of certain non-autonomous competitive systems of difference equations

17:10-17:35 *Zhan Zhou:* Positive: solutions of discrete Dirichlet problems involving the mean curvature operator

Chair: Zhan Zhou

17:35-18:00 *Bo Zheng:* Periodic solutions and stability of a discrete mosquito population model with periodic parameters

18:00-18:25 *Hongpeng Guo:* Dynamical behavior of a temporally discrete non-local reaction-diffusion equation on bounded domain

18:25-18:50 *Amy Veprauskas* (online)*:* Controlling a pest species: Multiple control mechanisms in a host-parasitoid system moved on 27th

Room B   Special Session 3: Bifurcations in Smooth and Nonsmooth Maps: Theory and Applications

Organizers: Davide Radi, Iryna Sushko

Chair: Wirot Tikjha

16:20-16:45 *Gian Italo Bischi:* Discrete Dynamical Systems with Memory in Social Sciences

16:45-17:10 *Jochen Jungeilges:* Estimating critical intensities for bull and bear states

17:10-17:35 *Tatyana Perevalova:* Analysis of the 5-piece dynamical model of financial markets

17:35-18:00 *Pasquale Commendatore* (online): The dynamics of industry location and residence choice in the presence of pollution and commuting costs

18:00-18:25 *Ilaria Foroni:* Border collision bifurcations associated with \\a piecewise linear map degenerate period adding structure

18:25-18:50 *Nicolo Pecora:* Nonlinear dynamics of a simple behavioral model of inflation

Room C   Regular Session

Chair: Soumitro Banerjee

16:20-16:45 *Armen Bagdasaryan* (online): Discrete-time Replicator Equations on Wardrop Optimal Networks

16:45-17:10 *Anurag Shukla:* Approximate controllability of semilinear discrete control systems

17:10-17:35 *Katarzyna Topolewicz* (online): Numerical analysis of the car following problem with different variable-order differential operators

17:35-18:00 *Assia Guezane Lakoud:* Analysis of a delay difference equation

18:00-18:25 *Henrique Olivera* (online): Huygens synchronization of three clocks

18:25-18:50 *Nouressadat Touafek* (online): A detailed study of the behavior of the solutions of a general second-order system of difference equation

Tuesday 25 June 9:00-14:00

9:00-10:00 **Victor Mañosa** (Chair Iryna Sushko)

Invariant graphs and dynamics in a family of piecewise linear maps

10:00-11:00 **Iryna Sushko** (Chair Thomas Michelischt)

Discontinuous maps and their applications: Exploring the bifurcation structures

11:00-12:00 **Jim Cushing** (Chair Saber Elaydi) Unsplitted room

Discrete-time Darwinian Dynamics

12:00-13:35 Lunch, Change of room configuration

Tuesday 25 June 14:00-16:05

Room A   **Special Session 4: Recent advances on time scales and its relation to difference equations**

Organizers: Tom Cuchta, Jaqueline Godoy Mesquita, Sabrina Streipert

Chair: Jaqueline Godoy Mesquita

13:35-14:00 *Mustafa Kulenovic:* Convergent solutions to non-autonomous difference equations

14:00-14:25 *Masakazu Onitsuka:* Ulam type stability for dynamic equations on a discrete time scale with two step sizes

14:25-14:50 *Hideaki Matsunaga:* Asymptotic constancy and asymptotic solutions of difference equations in a Banach space

14:50-15:15 *Tri Truong:* Fuzzy calculus on time scales

15:15-15:40 *Ewa Girejko:* Applications of Fuzzy Calculus to Dynamic Equations on Time Scales Applications of Fuzzy Calculus to Dynamic Equations on Time Scales

15:40-16:05 *Tom Cuchta:* Matrix-valued periodic functions on isolated time scales

Room B   **Special Session 3: Bifurcations in Smooth and Nonsmooth Maps: Theory and Applications**

Organizers: Davide Radi, Iryna Sushko

Chair: Tatyana Perevalova

13:35-14:00 *Zhanybai Zhusubaliyev* (online): Merging of a Chaotic Attractor in a Discontinuous Map Caused by a Pitchfork Bifurcation

14:00-14:25 *Davide Radi*: Bifurcation structures of a two-dimensional piecewise linear discontinuous map: Analysis of a cobweb model with regime-switching expectations

14:25-14:50 *Anastasiia Panchuk* (online): Bifurcation Structures in a Discontinuous 2D Map, Modeling Exchange Rate Dynamics

Room B   Special Session 2: Multidimensional chaos: formation, control and its application

Organizers: Alexey Kazakov, Dmitry Sinelshchikov, Nataliya Stankevich

Chair: Alexey Kazakov

14:50-15:15 *Alexey Kazakov:* (HSE University, Russia). On new types of wild Lorenz-like attractors

15:15-15:40 *Arturo Vieiro:* (University de Barcelona, Spain) Exploring chaos of near- identity maps through interpolating vector fields

15:40-16:05 *Ainoa Murillo:* (University de Barcelona, Spain) Periodic forcing of a 3D volume-preserving flow with a bubble of stability

Room C   Regular Session

Chair: Saber Elaydi

13:35-14:00 *Anushaya Mohapatra* (online)*:* Evolution of partial migration in stochastic environments

14:00-14:25 *Abdelkader Lakmeche:* Analysis of a conformable fractional derivative system

14:25-14:50 *Mohamed Helal:* A delay mathematical model for the dynamics of stem cells in leukemia with treatment

14:50-15:15 *Rasha Samarah:* Dynamics of Nash strategic maps in a simple game model with discrete preference

15:15-15:40 *Abdelrahim Mousa:* Hysterical Dynamics of player's behavior in a welfare coalition game

15:40-16:05 *Marc Chamberland:* The 3x+1 Problem; a discrete dynamics approach

16:05-16:30 Coffee Break

Tuesday 25 June 16:30-18:35

Room A   Special Session 1: On connections between differential, delay differential and difference equations, difference models of population dynamics and stochastic effects

Organizer: Elena Braverman

Chairman: Elena Braverman

16:30-16:55 *Yun Kang:* Stochasticity in Recruitment Ability on Collective Foraging Dynamics

16:55-17:20 *Gail Wolkowicz:* Difference Equation Models of Population Growth involving Distributed Delay

17:20-17:45 *Sabrina H. Streipert:* Derivation and analysis of discrete population models with delayed growth

17:45-18:10 *John Stavroulakis:* Going in circles: From numerical solutions of an impulsive equation to delay equations on manifolds

18:10-18:35 *Jehad Alzabut:* Advances in Stochastic Modeling of MERS Corona: Mathematical and Computational Innovations

Room B   Special Session 2: Multidimensional chaos: formation, control and its application

Organizers: Alexey Kazakov, Dmitry Sinelshchikov, Nataliya Stankevich

Chair: Nataliya Stankevich

16:30-16:55 *Nataliya Stankevich* (HSE University, Russia). Multidimensional chaos in the systems with pulsed action

16:55-17:20 *Christophe Letellier* (Rouen Normandie University, France). A flat control law for two diffusively *y*-coupled Rössler systems

17:20-17:45 *Efrosiniya Karatetskaya* (HSE University, Russia) The onset of Shilnikov chaos in a three-cell population model of cancer

17:45-18:10 *Sofia Rumyantseva* (HSE University, Russia) Difference and Differential Representations of Quadratic Operator on *su(1,1)*

18.10 – 18.35 *Dmitry Sinelshchikov* (online) (Biofisika Institutua, UPV/EHU, CSIC, Spain), Ivan Garashchyuk (Basque Center for Applied Mathematics, Spain) Hyperchaos and bifurcations in models of coupled gas bubbles oscillations

Room C   Regular Session

Chair: Peter Kloeden

16:30-16:55 *Magdalena Nockowska-Rosiak:* Hammerstein integrodifference equations-structural properties and their applications

16:55-17:20 *Hartung Ferenc:* On the application of equations with piecewise constant arguments in stability of difference equations and numerical approximation of functional differential equations

17:20-17:45 *Vladimir Svigler:* Isotropic stationary solutions of lattice differential equations

17:45-18:10 *Sangeeta Dhawan:* Hadamard Fractional Calculus on Nabla Time Scales

18:10-18:35 *Zbigniew Leśniak* (online): On limit sets of Brouwer homeomorphisms generating foliations of the plane

Wednesday 26 June 9:00-13:00

9:00-10:00 **Peter Kloeden** (Chair René Lozi)

Spatial discretisation of dynamical systems

10:00-10:30 **Amina Eladdadi** (Chair Saber Elaydi)

The U.S. National Science Foundation (NSF) Program Director

10:30-11:30 **ISDE General meeting**

<mark>11:30-12:50 Lunch, Change of room configuration</mark>

Wednesday 26 June 12:50-15:45

Room A   Special Session 6: Discrete Dynamical Systems and Applications in Mathematical Biology

Organizers: Bo Zheng, Jianshe Yu, Jia Li, Hongpeng Guo

Chair: Linchao Hu

12:50-13:15 *Huafeng Xiao:* Periodic solutions to differential equations with distributed delay

13:15-13:40 *Zhongcai Zhu:* Stability and periodicity in a mosquito population suppression model composed of two sub-models

13:40-14:05 *Peng Mei:* Homoclinic solutions for a class of partial difference equations

Chair: Hongling Zhou

14:05-14:30 *Yanshan Chen:* Existence of homoclinic solutions and ground state solutions for a discrete super-quadratic Schrödinger equation involving strongly indefinite potential

14:30-14:55 *Azmy S. Ackleh* (online): How Do Prey Dynamics Impact Predator-Prey Interactions?

Room A   Special Session 4: Recent advances on time scales and its relation to difference equations

Organizers: Tom Cuchta, Jaqueline Godoy Mesquita, Sabrina Streipert

Chair: Tom Cuchta

14:55-15:20 *Antonin Slavik:* Bessel functions on time scales and applications to partial dynamic equations

15:20-15:45 *Maria Lusia Morgado:* Finite Difference schemes for distributed-order diffusion equations

Room B   Special Session 7: On Stability and Bifurcation of Dynamical Systems

Organizers: Adina Luminița Sasu and Weinian Zhang

Chair Weinian Zhang

12:50-13:15 *Wenmeng Zhang* (online)*:* Takens Theorem for a partially hyperbolic dynamics

13:15-13:40 *Linfeng Zhou* (online)*:* Dichotomy and Asymptotic Equivalence for Systems in Banach Spaces

13:40-14:05 *Jiyu Zhong* (online)*:* Bifurcations and Arnold tongues of a multiplier-accelerator model

Chair Adina Luminița Sasu

14:05-14:30 *César Silva* (online)*:* A new global exponential stability criterion for delay difference equations with applications to neural networks with delay

14:30-14:55 *Álvaro Castañeda:* Parametrized Jacobian Conjecture

14:55-15:20 *Néstor Jara:* Spectrum invariance dilemma for nonuniformly kinematically similar systems

Room C   Regular Session

Chair: Thomas Michelitsch

12:50-13:15 *Chaitanya Gopalakrishna* (online): On the nonexistence of iterative roots of functions

13:15-13:40 *Giriraj Methi* (online): An effective approach for numerical solution of delay differential equations (online)

13:40-14:05 *Mansoor Saburov* (online): The Perron--Frobenius Theorem for Cubic Doubly Stochastic Matrices

14:05-14:30 *Sreelatha Chandragiri* (online): Riordan Arrays and Generating Functions for Generating Trees

14:30-14:55 *Stephen Baigent:* A class of planar population maps

14:55-15:20 *João Alves:* On the generating function space of a Volterra difference equation with infinite delay

15:20-15:45 *Ricardo López Ruiz:* Discrete Models in Econophysics: Inequality in Random Markets

<mark>15:45-16:20 Coffee Break</mark>

Wednesday 26 June 16:20-18:50

Room A   Special Session 3: Bifurcations in Smooth and Nonsmooth Maps: Theory and Applications

Organizers: Davide Radi, Iryna Sushko

Chair: Jochen Jungeilges

16:20-16:45 *Wirot Tikjha:* Properties of a two-dimensional non-invertible rational map

16:45-17:10 *Andrea Caravaggio:* Postcards from the edge: Technological competition and market dynamics

17:10-17:35 *Inese Bula* (online): Behavior of Systems of Piecewise Linear Difference Equations with Many Periodic Solutions

17:35-18:00 *Fausto Cavalli* (online): Dynamical analysis of an OLG model with interacting epidemiological and environmental domains

18:00-18:25 *Fabio Lamantia:* Evolutionary adoption of behavioral rules with finitely many players

18:25-18:05 *Mauro Sodini* (online): Environmental Policy and the Dynamics of Industrial Location and Residential Choice

Room B   Special Session 5: Construction and Analysis of Discrete Dynamical Systems with Applications to Studying the Dynamics of Biological Populations

Organizers: Paul Salceanu, Amy Veprauskas

Chair: Paul Salceanu

16:20-16:45 *Jim Cushing* Discrete-time Darwinian Dynamics

16:45-17:10 *Yun Kang* Optimal control of a discrete-time plant–herbivore/pest model with bistability in fluctuating environments

17:10-17:35 *Eddy Kwessi* Boltzmann type-Machine in Darwinian Evolution Population Dynamics

17:35-18:010 *Ziyad Al Shawari* Increasing delay as a strategy to prove stability in population models

18:00-18:25 *John Banks* Population models for the protection of ecosystem services

18:25-18:50 *Azmy Ackleh* (online) The Influence of Periodic Reproduction and Predator Evolution on the Dynamics of a Predator-Prey Model

Room C   Regular Session

Chair: Victor Avrutin

16:20-16:45 *Rafael Luís:* How far can we go in stability conditions for periodic maps?

16:45-17:10 *Rebelo Magda:* A generalization of the Maxwell integral model: the Maxwell-Mittag-Leffler model.

17:10-17:35 *Louis Morgado*: Time-fractional order models for charge transport in disordered semiconductor materials

17:35-18:00 *Mourad Azioune* (online): Study and Chaos Control on Discrete Dynamics of Cournot Triopoly Team-Game

18:00-18:25 *Rodica Luca Tudorache* (online): Positive solutions for a system of fractional q-difference equations with multi-point boundary conditions

18:25-18:50 *Ibtissem Redjam* (online):On dynamical behavior of discrete time non-linear higher-order fuzzy difference equation

Thursday 27 June 9:00-14:00

9:00-10:00 **Viktor Avrutin** (Chair Laura Gardini)

Chaotic Attractors and their Bifurcations in 1D and 2D maps

10:00-11:00 **Adina Sasu** (Chair René Lozi)

Admissibility and Asymptotic Behaviors of Dynamical Systems: from Global Methods to Ergodic Theory Approaches

11:00-12:00 **Best Paper award JDEA** (Chair Saber Elaydi)

The name of the recipient was announced during the ISDE General meeting

12:00-13:35 Lunch, Change of room configuration

Thursday 27 June 13:35-16:05

Room A   Special Session 5: Construction and Analysis of Discrete Dynamical Systems with Applications to Studying the Dynamics of Biological Populations

Organizers: Paul Salceanu, Amy Veprauskas

Chair: Paul Salceanu

13:35-14:00 *Saber Elaydi* Global Dynamics of Evolutionary autonomous and Periodic Models

14:00-14:25 *Gail Wolkowicz* Demonstration of a Standalone GUI Available on Github for Analyzing Planar Difference Equations

14:25-14:50 *Jude Kong* (online) Using stage structure to infer process-based models for species on the move

Room A   Special Session 7: On Stability and Bifurcation of Dynamical Systems

Organizers: Adina Luminița Sasu and Weinian Zhang

Chair Davor Dragičević

14:50-15:15 *Thorsten Hüls* (online)*:* Angular Spectrum: A New Concept For Measuring Rotational Dynamics

15:15-15:40 *Wolf-Jürgen Bey* (online) *n:* Perturbation Theory of Angular Spectra

15:40-16:05 *Laurian Suciu* (online)*:* Wold-type decompositions for m-isometries on Hilbert spaces

Room B   Special Session 6: Discrete Dynamical Systems and Applications in Mathematical Biology

Organizers: Bo Zheng, Jianshe Yu, Jia Li, Hongpeng Guo

Chair: Huafeng Xiao

13:35-14:00 *Kai Wang:* Global dynamics of a mosquito-borne disease model in heterogeneous environments

14:00-14:25 *Hongling Zhou:* Elementary methods to prove and improve the Cushing-Henson conjecture

Chair: Hongpeng Guo

14:25-14:50 *Linchao Hu:* Discrete model for mosquito population replacement in heterogeneous environments

14:50-15:15 *Jose S. Canovas* (online): The dynamics of the γ-Ricker model of order two

15:15-15:40 *Fangfang Liao*: Some new quadratic conditions for Hamiltonian elliptic systems

15:40-16:05 *Amy Veprauskas* (online): Controlling a pest species: Multiple control mechanisms in a host-parasitoid system

Room C   Special Session 4: Recent advances on time scales and its relation to difference equations

Organizers: Tom Cuchta, Jaqueline Godoy Mesquita, Sabrina Streipert

Chair: Sabrina Streipert

13:35-14:00 *Ozkan Ozturk:* Classification of Nonoscillatory Solutions of a Third Order Nonlinear Dynamic Equation

14:00-14:25 *Douglas Anderson:* Ulam stability and instability for ω-periodic dynamic equations on isolated time scales

14:25-14:50 *Arun Kumar Tripathy:* Behaviour of Solutions of a class of 2nd Order 2D Neutral Delay Difference Systems

14:50-15:15 *Alexander Lyapin:* Multidimensional discrete generating series of solutions to difference equations

15:15-15:40 *Petr Zemanek:* Spectral theory of linear Hamiltonian differential systems and discrete symplectic systems: Unified

15:40-16:05 *Aldo Pereira:* Abstract resolvent families on time scales

<mark>16:05-16:30 Coffee Break</mark>

Thursday 27 June 16:30-18:35

Room A   Special Session 7: On Stability and Bifurcation of Dynamical Systems

Organizers: Adina Luminița Sasu and Weinian Zhang

Chair Bogdan Sasu

16:30-16:55 *Liviu Cădariu-Brăiloiu:* Ulam Stability of a Second Linear Differential Operator with Nonconstant Coefficients

16:55-17:20 *Nicolae Lupa:* Exponential stability for discrete dynamics via evolution maps

17:20-17:45 *Oana Brandibur:* Stability and instability results for fractional-order differential equations with Prabhakar derivatives

Chair Adina Luminița Sasu

17:45-18:10 *Loredana Culda:* An oligopoly model with three time delays

18:10-18:35 *Ana Șirianțu* (online)*:* Zabczyk-Type Criteria for Stability of Discrete Dynamical Systems and Applications

Room B   Regular Session

Chair: Victor Mañosa

16:30-16:55 *Yacine Halim* (online)*:* Dynamics of a higher-order system of difference equations linked to generalized Balancing numbers

16:55-17:20 *Naeem Alkoum* (online)*:* shortest closed billiard orbits on convex table

17:20-17:45 *Anshul Sharma* (online)*:* Stability results for nonlinear fractional difference equations

Room C   Regular Session

Chair: Laura Gardini

16:30-16:55 *Sishu hankar Muni* (online)*:* Resonant torus doubling and hyperchaos in three-dimensional maps

16:55-17:20 *Kalifa Amira* (online): A multidimensional system of difference equations with coefficients linked to Fibonacci numbers

Friday 28 June 9:00-14:00

9:00-10:00 **Martin Bohner** (Chair Elena Braverman)

The Beverton–Holt Equation

10:00-11:00 **Agnieszka Malinowska** (Chair Adina Sasu)

Consensus in Fractional-Order Systems and Systems Defined on Time Scales

11:00-12:00 **Elena Braverman** (Chair Martin Bohner)

From continuous delayed differential systems to discrete models: can stochastic perturbations improve control outcome for difference equations?
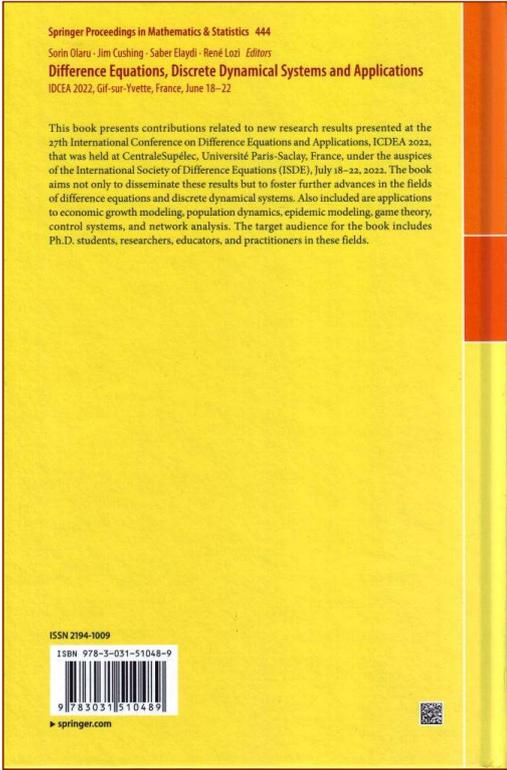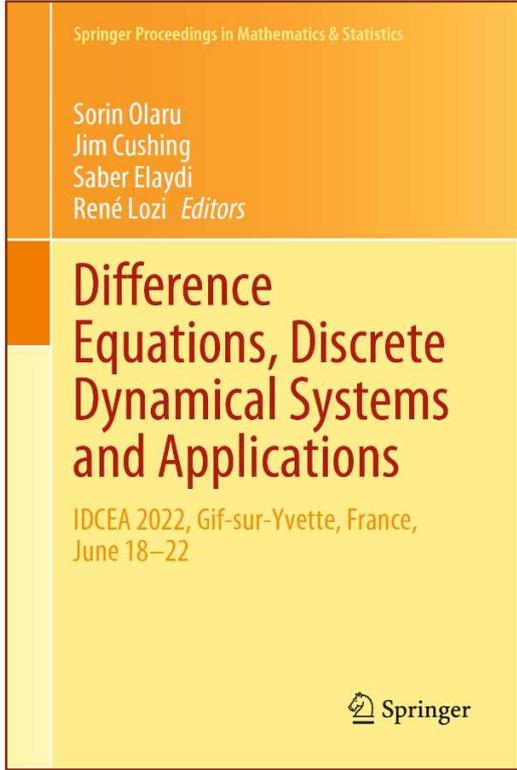
12:00-13:00 **Maia Martcheva** (Chair Mustafa Kulenovic) Unsplitted room (Online)

Hybrid Discrete-Continuous Epidemic Models

13:00-14:00 **Closing Ceremony**

<mark>14:00-15:30 Lunch</mark>

On sale: Proceedings of ICDEA 2022 Gif-sur-Yvette: https://link.springer.com/conference/icdea

Springer Proceedings in Mathematics & Statistics

Sorin Olaru
Jim Cushing
Saber Elaydi
René Lozi *Editors*

Difference Equations, Discrete Dynamical Systems and Applications

IDCEA 2022, Gif-sur-Yvette, France, June 18–22

Springer

Difference Equations, Discrete Dynamical Systems and Applications
IDCEA 2022, Gif-sur-Yvette, France, June 18–22

This book presents contributions related to new research results presented at the 27th International Conference on Difference Equations and Applications, ICDEA 2022, that was held at CentraleSupélec, Université Paris-Saclay, France, under the auspices of the International Society of Difference Equations (ISDE), July 18–22, 2022. The book aims not only to disseminate these results but to foster further advances in the fields of difference equations and discrete dynamical systems. Also included are applications to economic growth modeling, population dynamics, epidemic modeling, game theory, control systems, and network analysis. The target audience for the book includes Ph.D. students, researchers, educators, and practitioners in these fields.

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