11ᵗʰ CONFERENCE

"DYNAMICAL SYSTEMS APPLIED TO BIOLOGY AND NATURAL SCIENCES" (DSABNS)

FEBRUARY 4-7, 2020

SCIENTIFIC PROGRAM

DSABNS2020

CONFERENCE VENUE:

DIPARTIMENTO DI ECONOMIA E MANAGEMENT

UNIVERSITÀ DEGLI STUDI DI TRENTO

UNIVERSITÀ DI TRENTO — Dipartimento di Matematica

ESMTB — European Society for Mathematical and Theoretical Biology

GNAMPA iNδAM — "Gruppo Nazionale per l'Analisi Matematica, la Probabilità e le loro Applicazioni"

Università degli Studi di Torino — Dipartimento di Matematica

ITALIAN AGENCY FOR DEVELOPMENT COOPERATION

FONDAZIONE BRUNO KESSLER

PROVINCIA AUTONOMA DI TRENTO

(bcam) — basque center for applied mathematics

EXCELENCIA SEVERO OCHOA

EUSKO JAURLARITZA GOBIERNO VASCO — HEZKUNTZA SAILA DEPARTAMENTO DE EDUCACIÓN

MARIE CURIE ACTIONS

FEBRUARY 4th 2020						
	Aula Azzurra		**Aula 2B**		**Aula 2C**	
08:30 – 9:30	Registration					
09:30 – 09:45	Opening					
	Chair: Andrea Pugliese					
09:45 – 10:30	BAS KOOIJMAN	PUBLIC LECTURE: 40 YEARS OF DEVELOPMENT AND APPLICATION OF DYNAMIC ENERGY BUDGET THEORY	--	--	--	--
10:30 – 11:15	GIANFRANCO ANFORA	PUBLIC LECTURE: INCORPORATING MATHEMATICAL MODELS AND BIOCONTROL INTO IPM PROGRAMS FOR INVASIVE ALIEN INSECTS	--	--	--	--
11:15 – 11:40	Coffee Break					
	"Stochastic Models / Ecology" Chair: Paulo Doutor		**"Mathematical Epidemiology / Population Dynamics" Chair: Alberto D'Onofrio**		**"Mathematical Epidemiology/ Infectious Diseases" Chair: Nico Stollenwerk**	
11:40 – 12:10	CARLOS BRAUMANN	SUB-OPTIMAL HARVESTING POLICIES WITH STEPWISE EFFORT IN A RANDOM ENVIRONMENT	CHIARA POLETTO	HOST CONTACT DYNAMICS SHAPES RICHNESS AND DOMINANCE OF PATHOGEN STRAINS	VALENTINA MARZIANO	PARENTAL VACCINATION TO ACCELERATE THE PROGRESS TOWARDS MEASLES ELIMINATION IN ITALY
12:10 – 12:30	Ozan Kahramanogullari	STOCHASTIC MECHANISMS OF GROWTH AND BRANCHING IN MEDITERRANEAN CORAL COLONIES	Ryosuke Omori	MODELLING STUDY OF THE ASSOCIATION BETWEEN SEXUALLY TRANSMITTED INFECTIONS	Paul Georgescu	ANALYZING THE SPREAD OF A DISEASE WITH DUAL TRANSMISSION MODE VIA A METAPOPULATION MODEL: ROLES OF ACTIVE AND PASSIVE MOVEMENTS
12:30 – 12:50	Uffe Høgsbro Thygesen	OPTIMAL YIELD AND UTILITY IN STOCHASTIC BIOMASS MODELS	Andrea Torneri	THE EFFECTS OF COMPETION AMONG INFECTORS AND DEPLETION OF SUSCEPTIBLES ON THE REALIZED GENERATION INTERVALS	Gabriel Dimitriu	GLOBAL SENSITIVITY APPROACHES FOR MODELS DESCRIBING HIV DISEASE DYNAMICS
12:50 - 13:10	Patrícia Antunes	ADDITIVE MODELS - AN APPLICATION IN NATURAL SCIENCES	Angela Martiradonna	QUALITATIVE ANALYSIS AND NUMERICAL APPROXIMATION OF AN OPTIMAL CONTROL MODEL FOR INVASIVE SPECIES	Mostafa Adimy	GLOBAL DYNAMICS OF A DIFFERENTIAL-DIFFERENCE SYSTEM: A CASE OF KERMACK-McKENDRICK EPIDEMIC SIR MODEL WITH AGE-STRUCTURED PROTECTION PHASE
13:10 – 14:30	Lunch					
	Chair:Anna Marciniak-Czochra					
14:30 – 15:15	ROELAND MERKS	MATHEMATICAL MODELING OF CELL-EXTRACELLULAR MATRIX INTERACTIONS TO EXPLAIN COLLECTIVE CELL BEHAVIOR AND CELL MIGRATION	--	--	--	--
	"Mathematical Epidemiology / Game Theory" Chair: Edy Soewono		**"Delayed Differential Equations / Cancer" Chair: Fabio Milner**		**"Eco-Epidemiology/ Ecology" Chair: Maíra Aguiar**	
15:20 – 15:50	MAX SOUZA	ON THE SPATIAL DISPERTION OF WOLBACHIA IN WILD MOSQUITO POPULATIONS	EZIO VENTURINO	THE INFLUENCE POPULATIONS OF SHAPE ON INTERACTING POPULATIONS	MIMMO IANNELLI	MODELING CORAL REEFS: PROBLEMS IN ECOLOGICAL CONSERVATION
15:50 – 16:10	Rinaldo M. Colombo	CONTROL PROBLEMS AND GAMES IN CONSERVATION LAWS MOTIVATED BY BIOLOGY	Elena Piretto	EGFR TRAFFICKING AND SIGNALLING: INSIGHTS FROM MATHEMATICAL MODELLING	Galina Neverova	INFLUENCE OF HARVEST ON DYNAMICS OF "PREDATOR-PREY" COMMUNITY
16:10 – 16:30	Luciano Andreozzi	ON [NAME] STABLE EQUILIBRIA	Elena A. Martynova	HOW MANY GENES FROM Wnt-CASCADE IDENTIFY tnbc-PATIENTS?	Sangeeta Saha	IMPACT OF FEAR IN A TRI-TROPHIC FOOD CHAIN MODEL INCORPORATING PREY REFUGE
16:30 – 16:50	Amira Kebir	REPLICATOR EQUATIONS FOR STRUCTURED POPULATIONS: HAWK-DOVE GAME APPLICATION	Pirmin Schlicke	A MATHEMATICAL MODEL TO PREDICT GROWTH AND SIZE OF METASTATIC TUMORS UNDER THERAPY	Paolo Freguglia	A DYNAMICAL MODEL FOR SYMPATRIC SPECIATION IN AN ECOLOGICAL NICHE
16:50 – 17:10	Alberto Pinto	NASH EQUILIBRIA IN EVOLUTIONARY COMPETITIVE MODELS OF FIRMS AND WORKERS	Attila Dénes	GLOBAL ANALYSIS OF A CANCER MODEL WITH DRUG RESISTANCE DUE TO LAMARCKIAN INDUCTION AND MICROVESICLE TRANSFER	--	--
	Chair: Nico Stollenwerk					
17:15 – 18:00	LUCIA RUSSO	THE DYNAMICS OF RING NETWORKS OF DYNAMICAL SYSTEMS WITH PERIODICALLY FORCED INPUTS	--	--	--	--
18:00 – 19:30	Welcome Drinks and Poster Session					

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	FEBRUARY 5th 2020				
	Aula Azzurra		**Aula 2B**		**Aula 2C**
08:45 – 9:00	**Registration**				
	Chair: Maĺra Aguiar				
09:00 – 09:45	HAL SMITH	LOTKA-VOLTERRA PREDATOR-PREY SYSTEMS MODELING VIRUS DYNAMICS IN MARINE ECOSYSTEMS AND HIV INFECTION	--	--	--	--
09:45 – 10:30	ANNA MARCINIAK-CZOCHRA	MECHANISMS OF SYMMETRY-BREAKING AND PATTERN FORMATION DURING DEVELOPMENT: INSIGHTS FROM MATHEMATICAL MODELLING	--	--	--	--
10:30 – 11:00	**Coffee Break**				
	"Mathematical Epidemiology / Vectors and Vector-borne diseases I" Chair: Giorgio Guzzetta		**"Developmental Biology / Reaction-Diffusion" Chair: Rossana Vermiglio**		**"Mathematical Epidemiology / Cell Biology" Chair: Mattia Sensi**
11:00 – 11:30	ANDREA PUGLIESE	MODELLING THE TRANSMISSION DYNAMICS OF WEST NILE VIRUS IN EMILIA-ROMAGNA REGION (ITALY)	HEIKKI HAARIO	MODEL DISCRIMINATION BY RANDOM PATTERN DATA	NICO STOLLENWERK	FRACTIONAL FOKKER-PLANCK EQUATIONS IN POPULATION BIOLOGY
11:30 – 11:50	Pierre-Alexandre Bliman	FEEDBACK CONTROL PRINCIPLES FOR BIOLOGICAL CONTROL OF DENGUE VECTORS	Cinzia Soresina	BIFURCATIONS IN REACTION CROSS-DIFFUSION SYSTEMS FOR COMPETING SPECIES	Federico Reali	AN EXTHENDED DYNAMICAL MODEL OF α-SYNUCLIEN METABOLISM
11:50 – 12:10	Agnese Zardini	MODELLING THE SPATIO-TEMPORAL RISK OF MOSQUITO-BORNE DISEASES	Sara Sommariva	VALIDATION OF A DYNAMIC SYSTEM MODEL FOR THE COLON–RECTAL CANCER CELLS VIA CHEMICAL REACTION NETWORKS	Giovanni Filatrella	GLOBAL STABILITY ANALYSIS OF BIRHYTHMICITY IN A VAN DER POL TYPE SELF-SUSTAINED OSCILLATOR
12:10-12:30	Kamil Erguler	MODEL-BASED DESIGN AND ANALYSIS OF LIFE TABLE EXPERIMENTS FOR INSECT VECTORS OF DISEASE	Lukas Eigentler	SPATIAL SELF-ORGANISATION ENABLES SPECIES COEXISTENCE IN A MODEL FOR SAVANNA ECOSYSTEM	Simone Rusconi	POPULATION BALANCE APPROACH FOR PREDICTING POLYMER PARTICLES MORPHOLOGY
12:30-12:50	Slimane BenMiled	A CLIMATE-BASED MODEL FOR TICK LIFE CYCLE: AN INFINITE SYSTEM OF DIFFERENTIAL EQUATION APPROACH	Abdelhamid Ainouz	HOMOGENIZATION OF SOME REACTION-DIFFUSION SYSTEMS IN BIOLOGICAL TISSUES	Julia Delacour	A MODEL FOR THE GROWTH OF A p62-UBIQUITIN AGGREGATE INVOLVED IN CELLULAR AUTOPHAGY
12:50-13:10	Sk Shahid Nadim	IMPACT OF VENEREAL TRANSMISSION ON THE DYNAMICS OF VERTICALLY TRANSMITTED VIRAL DISEASES AMONG MOSQUITOES	--	--	Iacopo Ruolo	TFEB TRANSLOCATION DYNAMICS: QUANTITATIVE MODELLING AND EXPERIMENTAL ANALYSIS
13:20	**Lunch and FREE AFTERNOON**				

	FEBRUARY 6th 2020					
	Aula Azzurra		**Aula 2B**		**Aula 2C**	
08:45 – 9:00	**Registration**					
	Chair:Maíra Aguiar					
09:00 – 09:45	SUSANNE DITLEVSEN	OSCILLATING SYSTEMS WITH COINTEGRATED PHASE PROCESSES	--	--	--	--
09:45 – 10:30	KONSTANTIN BLYUSS (Skype talk)	STOCHASTIC AND TIME-DELAYED EFFECTS IN AUTOIMMUNE DYNAMICS	--	--	--	--
10:30 – 11:00	**Coffee Break**					
	"Mathematical Epidemiology / Health Policy" Chair: Valentina Marziano		**"Theoretical and Numerical Methods / General Session I" Chair: Carlos Braumann**		**"Mathematical Models in Population Biology / Infectious Disease Dynamics" Chair: Max Souza**	
11:00 – 11:30	PIERO MANFREDI	THE HARD PART OF THE MEASLES ENDGAME. HINTS FROM BEHAVIOURAL EPIDEMIOLOGY	ROSSANA VERMIGLIO	NUMERICAL APPROXIMATION OF THE BASIC REPRODUCTION NUMBER FOR STRUCTURED POPULATIONS	EZIO VENTURINO	DYNAMICS OF HSV-2 INFECTION WITH A THERAPEUTIC VACCINE
11:30 – 11:50	Rossella Della Marca	RAPID VACCINE OPINION SWITCHING: OPTIMAL AWARENESS CAMPAIGNS VIA DETERMINISTIC AND HEURISTIC ALGORITHMS	Dimitri Breda	PERIODICITY, DELAYS AND NUMERICAL METHODS IN BIOMATHEMATICS: A RECENT ACCOUNT	Dmitry Gromov	TWO-LEVEL EVOLUTION OF CHRONIC VIRAL INFECTIONS AND THE EFFECT OF THE POPULATION-LEVEL CONTROL
11:50 – 12:10	Eunha Shim	MATHEMATICAL MODELING OF PUBLIC HEALTH POLICIES	Monica Salvioli	GAME THEORY OF FISHERIES MANAGEMENT	Bruno M. P. M. Oliveira	FIT OF IMMUNE RESPONSES BY CD4 + T CELLS TRIGGERED BY LCMV INFECTION
12:10-12:30	Alberto Pinto	PERIODIC VACCINATION STRATEGIES IN THE REINFECTION SIRI MODEL	Othman Cherkaoui Dekkaki	VIABILITY ANALYSIS FOR A STOCK-CAPITAL FISHERY MODEL	João Maurício de Carvalho	CANCER DYNAMICS IN HIV INFECTED PATIENTS UNDER DIFFERENT IMMUNE FUNCTIONS
12:30-12:50	Maha Alsharari	INCORPORATION OF AWARENESS PROGRAMS INTO A MODEL OF THE SPREAD OF HIV/AIDS AMONGST PEOPLE WHO INJECT DRUGS (PWIDs)	J. Leonel Rocha	ALLEE EFFECT BIFURCATION IN THE γ-RICKER POPULATION MODEL USING THE LAMBERT W FUNCTION	Sonja Radosavljevic	POVERTY TRAPS IN MULTILEVEL SYSTEMS
12:50-13:10	Hee-Dae Kwon	OPTIMAL CONTROL PROBLEM OF INFLUENZA MODELS WITH INEQUALITY CONSTRAINTS	Do Wan Kim	NON-LOCAL BOUNDARY CONDITION IN A COMPUTATIONAL DOMAIN OF EXTERIOR PROBLEMS	Andrei Halanay	A DELAY DIFFERENTIAL EQUATIONS MODEL FOR THE ACTION OF THE IMMUNE SYSTEM IN MALARIA
13:10 – 14:30	**Lunch**					
	Chair: Hal Smith					
14:30 – 15:15	REBECCA TYSON	PHASE-SENSITIVE CRITICAL TRANSITIONS IN PREDATOR-PREY SYSTEMS	--	--	--	--
			Aula 2A		**Aula 2C**	
	"Mathematical Epidemiology / Vectors and Vector-borne Diseases II" Chair: Pierre-Alexandre Bliman		**"Mathematical Epidemiology / Models for Social Behavior" Chair: Paolo Freguglia**		**"Mathematical Models in Population Biology / Predator-Prey Systems" Chair: Angela Martiradonna**	
15:20 – 15:50	EDY SOEWONO	CAUSALITY ANALYSIS OF DENGUE TRANSMISSION IN BANDUNG, INDONESIA	ALBERTO D'ONOFRIO	BEHAVIOUR INDUCED PHASE TRANSITIONS IN EPIDEMIOLOGY OF INFECTIOUS DISEASES	CHRISTIAN KUEHN	MODERN NUMERICAL CONTINUATION METHODS FOR BIOLOGICAL SYSTEMS
15:50 – 16:10	Mahmoud Ibrahim	THRESHOLD DYNAMICS IN A PERIODIC MODEL FOR ZIKA VIRUS DISEASE	José Martins	REINFECTION THRESHOLDS DETERMINED BY THE MAXIMUM CURVATURE OF THE ENDEMIC STATE	Hamlet Castillo Alvino	INTERFERENCE COMPETITION ON GROUP DEFENSE WITH HOLLING TYPE IV COMPETITIVE RESPONSE
16:10 – 16:30	Jai Prakash Tripathi	A SOCIAL INTERACTION MODEL WITH HOLLING TYPE II FUNCTIONAL RESPONSE	Prashant K.Srivastava	IMPACT OF INFORMATION ON TREATMENT AS WELL AS ON DISEASE DYNAMICS	Oksana Revutskaya	COMPLEX DYNAMICS OF DISCRETE-TIME PREDATOR-PREY SYSTEM WITH STAGE-STRUCTURED PREY
16:30 – 16:50	Urszula Skwara	NUMERICAL ASPECTS IN MATHEMATICAL MODELLING OF VECTOR-BORNE DISEASES	Giorgio Martalò	OPTIMAL STRATEGIES MINIMIZING THE CONTROL OPERATION COSTS IN BIOCELL COMPOSTING	Deeptajyoti Sen	DYNAMICAL BEHAVIOR OF PREDATOR-PREY MODEL SUBJECTED TO ALLEE EFFECT IN THE PREDATOR
16:50 – 17:10	Akhil Srivastav	MODELING THE IMPACT OF EARLY CASE DETECTION ON DENGUE TRANSMISSION: DETERMINISTIC VS STOCHASTIC	Romina Travaglini	AN OPTIMAL CONTROL PROBLEM FOR DEGRADATION OF WASTE IN LANDFILLS UNDER ANAEROBIC CONDITIONS	Partha Sarathi Mandal	IMPACT OF ADDITIVE ALLEE EFFECT ON THE DYNAMICS OF A INTRAGUILD PREDATION MODEL WITH SPECIALIST PREDATOR
	Chair: Bas Kooijman					
17:15 – 18:00	BOB W. KOOI	INDIVIDUAL DEB-BASED STRUCTURED POPULATION MODELING	--	--	--	--
19:30:00	**CONFERENCE DINNER**					

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	FEBRUARY 7th 2020					
	Aula Azzurra		**Aula 2B**		**Aula 2C**	
08:45 – 9:00	**Registration**					
	Chair: Bob W. Kooi					
09:00 – 09:45	CONSTANTINOS SIETTOS	CAN DYNAMICAL MODELS IN BIOLOGY AND NATURAL SCIENCES GO BEYOND INFINITY?	--	--	--	--
09:45 – 10:30	MAÍRA AGUIAR	ON THE ORIGIN OF COMPLEX DYNAMICS IN MULTI-STRAIN DENGUE MODELS	--	--	--	--
10:30 – 11:00	**Coffee Break**					
	"Mathematical Epidemiology / Physiological Models" Chair: Paula Patrício		**"Multi-Scale Systems" Chair: Dimitri Breda**		**"Mathematical Epidemiology / Genetics" Chair: Heikki Haario**	
11:00 – 11:30	PAULO DOUTOR	DELAYING AGE OF INFECTION: A PERNICIOUS EFFECT OF VACCINATION	NICO STOLLENWERK	TIME SCALE SEPARATION: COMPARISON OF SINGULAR PERTURBATION AND CENTER MANIFOLD ANALYSIS UNDER SCALING	CLAUDIA FERREIRA	AEDES AEGYPTI AND WOLBACHIA INTERACTION
11:30 – 11:50	Fabio Milner	A MODEL FOR ACUTE MYELOID LEUKEMIA (AML)	Panagiotis Papaioannou	FOREX FORECASTING USING PRINCIPAL COMPONENT ANALYSIS AND LOCAL LINEAR EMBEDDING	Manuel Molina	MATHEMATICAL MODELING OF POPULATION DYNAMICS IN BIOLOGICAL SPECIES
11:50 – 12:10	Giulia Simoni	POPULATION-BASED AND PATIENT-STRATIFICATION APPROACHES APPLIED TO A HUMAN CARDIAC MODEL OF ELECTROPHYSIOLOGY	Alberto Bersani	SINGULAR PERTURBATION TECHNIQUES AND ASYMPTOTIC EXPANSIONS FOR AUXILIARY ENZYME REACTIONS	Torsten Lindström	DESTABILIZATION, STABILIZATION, AND MULTIPLE ATTRACTORS IN SATURATED MIXOTROPHIC ENVIRONMENTS
12:10 – 12:30	Erica Ipocoana	BREATHING AS A PERIODIC GAS EXCHANGE IN A DEFORMABLE POROUS MEDIUM	Evangelos Galaris	USING DATA MINING TO CONSTRUCT DYNAMICAL EQUATIONS FROM AGENT-BASED PEDESTRIAN SIMULATORS	Oksana Zhdanova	MATHEMATICAL MODELLING OF SELECTION BY A SEX-LIMITED FEMALE TRAIT: TO THE QUESTION OF LITTER SIZE POLYMORPHISM IN NATURAL POPULATIONS OF ARCTIC FOXES
12:30 – 12:50	Stefan Schuster	JENSEN'S INEQUALITY AS A TOOL FOR EXPLAINING THE EFFECT OF OSCILLATIONS ON THE AVERAGE VALUES OF VARIABLES	Mattia Sensi	A GSPT APPROACH TO EPIDEMICS ON HOMOGENEOUS GRAPHS	Tatiana Guseva	HOMEOBOX GENES: INVESTIGATING THE DEVELOPMENT OF PINUS SYLVESTRIS (SCOTS PINE)
12:50 – 14:00	**Lunch**					
	"Population Biology / Plant Dynamics" Chair: Mimmo Iannelli		--		**"Mathematical Epidemiology / Disease Control" Chair: Piero Poletti**	
14:00 – 14:30	SARA PASQUALI	A STAGE STRUCTURED DEMOGRAPHIC MODEL FOR INSECT PEST DYNAMICS	--	--	GIOVANNI PUTOTO	USING DIGITAL METHODS IN EPIDEMIOLOGY TO ADDRESS DISEASE CONTROL IN SUB SAHARAN AFRICA: EXPERIENCES AND PERSPECTIVES OF DOCTORS WITH AFRICA CUAMM
14:30 – 14:50	Annalisa Iuorio	MODELLING COMPETITIVE INTERACTIONS AND PLANT-SOIL FEEDBACK IN VEGETATION DYNAMICS	--	--	Margherita Galli	EFFECTIVENESS OF MEASLES SURVEILLANCE IN SOUTH WEST SHOA ZONE OF THE OROMIA REGION, ETHIOPIA
14:50 – 15:10	Fabio Tedone	MODELLING THE ROOT GROWTH: AN OPTIMAL CONTROL APPROACH TO LINK BIOLOGY AND ROBOTICS	--	--	Valentina Veronesi	MODELING THE INFLUENCE OF MALNUTRITION ON MEASLES EPIDEMIOLOGY IN ETHIOPIA
15:10 – 15:30	Indrajit Ghosh	ESTIMATING THE PROPORTION OF SEXUAL TRANSMISSION ON ZIKA VIRUS SPREAD	--	--	Abhishek Senapati	EFFECT OF ADULT MOSQUITO CONTROL ON DENGUE PREVALENCE IN A MULTI-PATCH SETTING: A CASE STUDY IN KOLKATA (2014–2015)
	Chairs:Andrea Pugliese, Piero Manfredi and Constantinos Siettos					
15:30 – 16:15	ROUND TABLE	Novel Coronavirus (2019-nCoV)	--	--	--	--
16:15 – 16:30	**Closing**					

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