Schedule of talks

Dynamics, Topology and Computations

June 15 - 20, 2015, Bedlewo, Poland

International Conference
organized by

Stefan Banach International Mathematical Center

Faculty of Mathematics and Computer Science
of the
Jagiellonian University in Kraków

European Science Foundation

The Committee on Mathematics
of the
Polish Academy of Sciences

Warsaw Center of Mathematics and Computer Science
Monday, 15 June

8:00–9:00  Breakfast

9:00–9:50  V. de Silva, Topological persistence via category theory
10:00–10:50  M. Farber, Topology of large random spaces

Coffee break

11:30–12:20  P. Pilarczyk, A combinatorial-topological approach to automatic classification of global dynamics
12:30–13:00  J. Mireles James, Coexistence of stationary hexagons and rolls in a spatial pattern formation problem: a computer assisted proof

13:00  Lunch

15:30–16:00  P. Skraba, An approximate nerve theorem

Parallel session I

16:00–16:30  M. Capiński, Arnold diffusion in the elliptic restricted 3-body problem
16:30–17:00  A. Siliuszyk, New central configurations in the planar 6-body problem

Coffee break

17:30–18:00  A. Prokopenya, Integrable cases of evolutionary equations in the restricted three-body problem with variable masses

Parallel session II

16:00–16:30  A. Borat, Higher dimensional motion planners for $F(R^n, k)$
16:30–17:00  M. Cohen, The probability of choosing the unknot among 2-bridge knots using random Chebyshev billiard table diagrams

18:00–18:30  M. Ethier, Persistence of singular eigenspaces
18:30–19:00  M. Juda, Scalable homology computing

19:00  Dinner
Tuesday, 16 June

8:00–9:00  Breakfast

9:00–9:50  M. Guzzo, Numerical computation of stable and unstable manifolds with fast Lyapunov indicators. Applications to the three body problem

10:00–10:50  J. Figueras, How hyperbolic invariant tori bifurcate to strange objects: from numerics to rigorous results

Coffee break

11:30–12:20  Y. Hiraoka, Random topology, minimum spanning acycle, and persistent homology

12:30–13:00  P. Franek, Robust properties of zero sets via homotopy theory

13:00  Lunch

15:30–16:00  H. Koch, On hyperbolicity in the renormalization of near-critical area-preserving maps

Parallel session I

16:00–16:30  A. Luque, Computer assisted proofs in KAM theory

16:30–17:00  A. Wasieczko-Zajac, Geometric proof of strong stable/unstable manifolds with application to the Restricted Three Body Problem

Parallel session II

16:00–16:30  V. Kurlin, Homologically persistent skeleton in computer vision and beyond

16:30–17:00  I. Knyazeva, Computational topology approach for pattern recognition in 2D images

17.00–17.30  C. Reinhardt, Rigorous computation of unstable manifolds for nonlinear parabolic PDEs via the parametrization method

Coffee break

18:00  Poster session

19:30  Bonfire
WEDNESDAY, 17 JUNE

8:00–9:00   Breakfast

9:00–9:50   K. Turner, *PCA of persistent homology rank functions with case studies in point processes, colloids and sphere packings*

10:00–10:50 H. Ito, *Integrable and superintegrable vector fields and their normal forms at equilibria*

Coffee break

11:30–12:00 J. Gomez-Serrano, *Computer-assisted proofs in incompressible fluids*

12:45   Lunch

13:45   Excursion to the National Park

14:00   Excursion to Poznań

19:00   Dinner
Thursday, 18 June

8:00–9:00  Breakfast

9:00–9:50  N. Makarenko, *Geometry and topology of digital images*

10:00–10:50  J. Meiss, *Using witness complexes to analyze dynamical time series*

Coffee break

11:30–12:20  S. Mukherjee, *Consistency of maximum likelihood estimation for some dynamical systems*

12:30–13:00  M. Mrozek, *Constructing combinatorial multivector fields from data*

13:00  Lunch

15:30–16:00  T. Kaczyński, *Towards a formal tie between combinatorial and classical vector field dynamics*

Parallelsession I   Parallelsession II

16:00–16:30  S. Pilyugin, *Inverse shadowing for actions of finitely generated groups*

16:30–17:00  J. Cyranka, *A construction of two different solutions to an elliptic system*

Coffee break

17:30–18:00  A. Czechowski, *Rigorous numerics for the FitzHugh-Nagumo slow-fast system*

18:00–18:30  R. Szczelina, *Rigorous integration of delay differential equations and applications*

18:30–19:00  A. Belova, *Estimation of the rotation number by interval methods*

19:00  Bonfire
**Friday, 19 June**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00–9:00</td>
<td>Breakfast</td>
</tr>
<tr>
<td>9:00–9:50</td>
<td>A. Patel, <em>Persistent homology for maps</em></td>
</tr>
<tr>
<td>10:00–10:50</td>
<td>M. Kahle, <em>The most persistent cycles in random geometric complexes</em></td>
</tr>
<tr>
<td></td>
<td>Coffee break</td>
</tr>
<tr>
<td>11:30–12:20</td>
<td>I. Taimanov, <em>Topological analysis of three-dimensional geological models</em></td>
</tr>
<tr>
<td>12:30–13:00</td>
<td>T. Wanner, <em>Rigorous validation of isolating blocks for flows</em></td>
</tr>
<tr>
<td>13:00</td>
<td>Lunch</td>
</tr>
<tr>
<td>15:30–16:00</td>
<td>D. Wilczak, <em>When chaos meets hyperchaos</em></td>
</tr>
</tbody>
</table>

**Parallel session I**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>16:00–16:30</td>
<td>F. Weilandt, <em>The discrete Conley index as the homotopy type of a space</em></td>
</tr>
<tr>
<td>16:30–17:00</td>
<td>E. Vieira, <em>Transition matrices theory</em></td>
</tr>
<tr>
<td></td>
<td>Coffee break</td>
</tr>
<tr>
<td>17:30–18:00</td>
<td>D. Cherkashin, S. Kryzhevich, <em>Weak shadowing in topological dynamics</em></td>
</tr>
</tbody>
</table>

**Parallel session II**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>16:00–16:30</td>
<td>R. Castelli, <em>Fourier-Taylor parameterisation of invariant manifold for periodic orbits of vector field</em></td>
</tr>
<tr>
<td>16:30–17:00</td>
<td>R. Sheombarsing, <em>Rigorous numerics for ODEs using Chebyshev series and domain decomposition</em></td>
</tr>
<tr>
<td></td>
<td>Coffee break</td>
</tr>
<tr>
<td>17:30–18:00</td>
<td>K. Kropielnicka, <em>Effective approximation for the time dependant, linear Schrödinger equation</em></td>
</tr>
<tr>
<td>18:00–18:30</td>
<td>I. Walawska, <em>Bifurcations and continuation of halo orbits – rigorous numerical approach</em></td>
</tr>
<tr>
<td>18:30–19:00</td>
<td>K. Soga, <em>Numerical methods of weak KAM theory</em></td>
</tr>
<tr>
<td>19:00</td>
<td>Dinner</td>
</tr>
</tbody>
</table>
SATURDAY, 20 JUNE

8:00–9:00  Breakfast

9:00–9:50  G. Arioli, *Symmetric boundary value problems and non-symmetric solutions*

10:00–10:50  Z. Galias, *On periodic windows for the Hénon map close to the classical case*

12:00  Lunch
Poster session on Tuesday, 16 June, starting at 18:00

D. Lima
*Smale’s cancellation theorem: birth and death of connections*

B. Garda
*An efficient method to find all low-period windows for the logistic map*

M. Scolamiero
*Invariants for multidimensional persistence*

M. R. da Silveira
*Continuation detected through a spectral sequence analysis.*

J. Duda
*Maximal entropy random walk - when topology is not enough*

A. Gierzkiewicz
*Integrability of the Szekeres system*

I. Makarenko
*3D morphology of a random field from its 2D cross-section*

K. Soga
*Numerical methods of weak KAM theory*

A. Czechowski, P. Zgliczyński
*Rigorous numerics for PDEs with indefinite tail: existence of a periodic solution of the Boussinesq equation with time-dependent forcing*

M. Moczurad, P. Zgliczyński
*New lower bound estimates for quadratures of bounded analytic functions*

G. Jabłoński
*Persistence of generalized eigenspaces of self-maps*