ADRIAN BÎRZU

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Physical chemistry Nonlinear dynamics and dynamics of complex systems

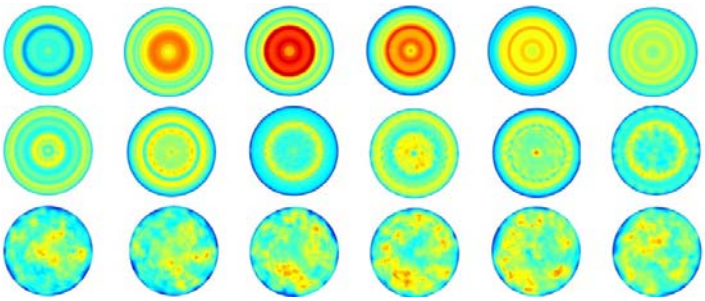
Research directions

- **Nonlinear dynamics:** dynamics of nonlinear spatially extended electrochemical systems.
- **Dynamics of complex systems:** (a) dynamics of complex reaction-diffusion systems; (b) data analysis in complex dynamical systems; (c) dynamical studies in microfluidic electrochemical cells.
- **Mathematical/numerical modeling of complex systems**.

Nonlinear dynamics: mathematical modeling and numerical simulation of spatially extended nonlinear electrochemical systems.

Dynamics of complex systems: (a) numerical modeling of nonlinear reaction-diffusion systems; (b) time series analysis in point-like and spatially extended nonlinear systems (including KL decomposition, Hilbert transform etc.); (c) mathematical and numerical modeling of dynamics in microfluidic flow cells.

Keywords: nonlinear dynamics, electrochemical systems, spatially extended systems, oscillatory dynamics, chaos, complex systems, reaction-diffusion systems, coupled oscillators, numerical simulations



PhD
Alexandru Ioan Cuza University, Iasi, 2000

Visiting scientist
Univ. Bremen
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T.U. München
Univ. Debrecen
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Invited lectures
Fritz Haber Institut der MPG, Berlin
St. Louis University
Univ. of New Orleans
Univ. Debrecen

Publications (selection)

Bîrzu, **A.**, Jia, Y., Sankuratri, V., Liu, Y., Kiss, I. Z., Spatially distributed current oscillations with electrochemical reactions in microfluidic flow cells, *ChemPhysChem* 16, 2015, 555-566, **2015**.

Bîrzu, **A.**, Kiss, I. Z., Asymmetrical multiphase front propagation and localized oscillations in a reaction-migration iron electrodissolution model with microfluidic flow cell geometry, *J. Solid State Electrochem.* 19, 3229-3240, **2015**.

Bîrzu, **A.**, Coleman, J., Kiss, I. Z., Highly disparate activity regions due to non-uniform potential distribution in microfluidic devices: simulations and experiments, *J. of Electroanal. Chem.* 726, 27-35, **2014**.

Bîrzu, **A.**, Gáspár, V., Complex spatio-temporal dynamics in metal electrodissolution: three-dimensional cell geometry models, *Journal of Computational Interdisciplinary Sciences* 3, 1, **2012**.

Bîrzu, **A.**, Krischer, K., Resonance tongues in a system of globally coupled FitzHugh-Nagumo oscillators with time periodic coupling strength, *Chaos* 20, 043114, **2010**.

Bîrzu, **A.**, Gáspár, V., Synchronization of electrochemical oscillators of S-NDR type, *Electrochim. Acta* 55, 383-394, **2009**.