**Call for Participation**
**PLEASE DISTRIBUTE**
**1ˢᵀ SCHOOL ON REACTION SYSTEMS**
**AND**
**2ⁿᵈ INTERNATIONAL WORKSHOP**
**ON REACTION SYSTEMS**

Toruń, Poland, June 3-7, 2019
Complete information about this event is available at
http://wors2019.mat.umk.pl
Contact e-mail: wors2019@mat.umk.pl

## Important Dates:

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| School | June 3-5, 2019 |
| Workshop | June 5-7, 2019 |
| Registration deadline | May 17, 2019 |

## Participation and social event:

Participation in both the School and the Workshop (including coffee breaks and lunches) is **free**, however, the registration on the event website before May 17 is necessary.

The event dinner, joint for the School and the Workshop, will take place in Collegium Maximum, an impressive ceremonial building of Nicolaus Copernicus University. The price of attending the dinner is €30, paid on the spot.

## School and Workshop:

Since their introduction about 10 years ago, reaction systems matured into a fruitful and dynamically evolving research area, which attracted a noticeable group of researchers. The original motivation was the understanding of interactions of biochemical reactions in the living cell and since then reaction systems have developed as an innovative approach to formal modelling of biological systems. They have also become a popular novel model of interactive computation.

Due to growing interest in this research area, the need has arisen to organise a periodic workshop providing a forum for exchanging research ideas and, hopefully, initiating new or strengthening already existing collaborative research efforts. The first workshop took place in Milano, Italy, in June 2018. The second meeting will take place in Toruń, Poland, in the period 3-7 June 2019.

The meeting in Toruń will consist of a school and a workshop. The school will take place from Monday, June 3, until Wednesday, June 5. The school program consists of tutorial lectures accessible also to participants who are not yet familiar with reaction systems. They will cover the biological aspects of reaction systems, the computational aspects of reaction systems (reaction systems as a model of interactive computation), and the relationship of reaction systems to other models of computation. Then the workshop will take place from Wednesday, June 5, until Friday, June 7. The workshop program will cover the recent as well as by now established scientific results. Also, the presentations of work in progress are welcome. Moreover, the program of the workshop is designed in such a way as to provide enough time (and classroom space) to instigate collaboration between participants.

The school and the workshop are of interest to mathematicians and computer scientists (PhD students and researchers) interested in models of computation as well as bioinformaticians and biologists interested in foundational / formal understanding of biological processes.

## The lectures of the school are scheduled as follows:

- G. Rozenberg, Leiden, The Netherlands – "Introduction to reaction systems"
- A.E. Porreca, Marseille, France – "State sequences of reaction systems"
- D. Besozzi, Milano, Italy – "Biological aspects of reaction systems"
- Ł. Mikulski, Toruń, Poland – "Equivalences for reaction systems"
- J. Kleijn, Leiden, The Netherlands – "Evolving reaction systems"
- G. Rozenberg, Leiden, The Netherlands – "Qualitative vs quantitative reaction systems"
- W. Penczek, Warsaw, Poland – "Logic for reaction systems (model checking)"
- P. Milazzo, Pisa, Italy – "Genetic regulatory networks"
- P. Bottoni, Rome, Italy – "Networks of Reaction Systems"
- R. Brijder, Hasselt, Belgium – "Chemical Reaction Networks"
- H.-J. Kreowski, Bremen, Germany – "Graph-based reaction systems"
- G. Rozenberg, Leiden, The Netherlands – "Zoom structures and exploration systems"

- A. Leporati, Milan, Italy – "Membrane systems"
- M. Koutny, Newcastle, United Kingdom – "Petri nets and reaction systems"
- A. Yakovlev, Newcastle, United Kingdom – "Asynchronous Computations"
- L. Manzoni, Milano, Italy – "Cellular automata, dynamical systems, and reaction systems"

**Invited speakers for the Workshop:**
- R. Gori, Pisa, Italy – "Causalities in reaction systems"
- G. Mauri, Milano, Italy – "Membrane systems and computational complexity"

**Contributed talks for the Workshop include:**
- P. Bottoni, Rome, Italy – "Transactions and contracts based on reaction systems"
- L. Brodo, Sassari, Italy – "Embedding reaction systems into link-calculus"
- E. Csuhaj-Varju, Budapest, Hungary – "Distributed reaction automata"
- D. Genova, Jacksonville, Florida, USA – "Modeling reaction systems by forbidding and enforcing"
- J.H. Hoogeboom, Leiden, The Netherlands – "Graph representation of equivalent reaction systems"
- D. Janssens, Antwerp, Belgium – "Process graphs for reaction systems"
- M. Koutny, Newcastle, UK – "Reaction systems, transition systems, and equivalences"
- A. Labella, Rome, Italy – "Reaction systems with influence on the environment"
- L. Manzoni, Milano, Italy – "Elementary reaction systems"
- L. Manzoni, Milano, Italy and A.E. Porreca, Marseille, France – "What do we know (and what we don't) about the computational complexity of reaction systems"
- W. Penczek, Warsaw, Poland – "A temporal logic for chemical exploration systems"
- A.E. Porreca, Marseille, France – "Shapes of dependencies in reaction systems"
- A. Skowron, Warsaw, Poland – "Rough sets and reaction systems"
- A. Yakovlev, Newcastle, UK – "Bringing asynchrony to reaction systems"

Abstracts of the workshop talks will be placed on the event website.

## Student grants:

Student grants, provided by the City Council of Toruń and Nicolaus Copernicus University, are still available. To apply for a grant you need to be a PhD or a MSc student.

Successful applications cover an accommodation in University Hotel (June 2-6 – four nights) in a single room in a studio consisting of two rooms (with shared bathroom).

To apply for a grant you need to send (to wors2019@mat.umk.pl) before May 10:
- scientific CV,
- motivation letter,
- support letter from your supervisor, and
- document confirming your student status.

The number of grants is limited.

## Accommodation:

Toruń is a tourist town and offers a wide range of accommodations. The old town is located within a walking distance (about 7 minutes) from the event venue and dozens of hotels with a wide range of prices are available. We strongly recommend to find a suitable accommodation through the online accommodation booking website www.booking.com. You may also consider staying in one of many different private apartments which are available at: Airbnb.

Please note that June falls within the tourist and outdoor sport season in Toruń, so it is advisable to book an accommodation well in advance of the event.

# City of Toruń

Toruń, one of the oldest cities in Poland, is located on the Vistula river in the northern part of the country, and is best known as the birthplace of the astronomer **Nicolaus Copernicus**. In 1997 the medieval part of the city was designated a **UNESCO World Heritage Site**, and in 2007 the Old Town in Toruń was designated as one of the **Seven Wonders of Poland**. Toruń is also European City of Sport in 2019.

National Geographic rated the old town market and the Gothic town hall as one of the **30 Most Beautiful Places in the World**. Toruń has many monuments of architecture beginning from the Middle Ages. Most of them have an almost intact medieval layout.

Toruń has the largest number of preserved Gothic houses in Poland, many with original wall paintings or wood-beam ceilings from the 16th to the 18th century. Among the most important monuments are: the Cathedral John the Evangelist and John the Baptist (14th century), St. Mary Church (14th century), the Old Town Hall (12th-16th century) - one of the most monumental town halls in Central Europe, ruins of the city fortifications (12th-15th century), and the 15th-century Gothic house (now a museum) where Nicolaus Copernicus was born.

## Travel

**By plane:** The nearest airports are in (60 km) Bydgoszcz (low cost airlines across Europe), Poznań airport (140 km, low cost airlines across Europe), Gdańsk airport (~180 km, low cost airlines across Europe, connected by motorway) and Warsaw - Okęcie airport - long haul airlines (230 km) - or Modlin airport.

**By train:** Polish State Railways operate train connections to Toruń from Warsaw, Poznań, Gdańsk, Łódź, Katowice and Olsztyn. Toruń's main railway station is Toruń Główny (positioned across the river Vistula from the Old Town).

**By car:** A1 motorway runs between Toruń and Gdańsk - quick way (170 km). Warsaw can be reached via A1+A2 motorways (260 km). **By bus:** There are many connections to Toruń. Bus station is a short walk from the Old Town.

## Nicolaus Copernicus University

The Nicolaus Copernicus University in Toruń (NCU) is one of the largest universities in Poland, currently comprising 17 faculties providing courses for almost 30 000 students, offering education in over 80 fields of study. QS World University Ranking has placed NCU in the top 4% of universities in the world.

## Faculty of Mathematics and Computer Science (the venue of the event)

The Faculty of Mathematics and Computer Science was founded in 1993, but, mathematical sciences were developed in NCU from the very beginning of its existence, first, within departments, later, in the Institute of Mathematics – a part of the Faculty of Mathematics, Physics and Chemistry. In the 1960s a new specialization, a 'numerical division', was established. It can be regarded as the beginning of the computer science studies in Toruń.

Well-equipped laboratories, lecture halls, and the library providing access to the large collection of resources, together with free wireless Internet access in the halls, form a modern infrastructure. The building of the Faculty is within a 7 minute walking distance from the Old Town, which offers a wide range of restaurants and affordable hotels.

# Collegium Maximum of NCU (the venue of the dinner)

Designed by Julius Habicht, the Collegium Maximum was built in 1905 and refers to the Dutch Renaissance style.

For nearly 100 years, it was the seat of banks (the Bank of the Reich and the National Bank of Poland). Since 2003 it is the representative building of the Nicolaus Copernicus University and the seat of the University Museum.

## Committees:

### Program Committee Co-chairs

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