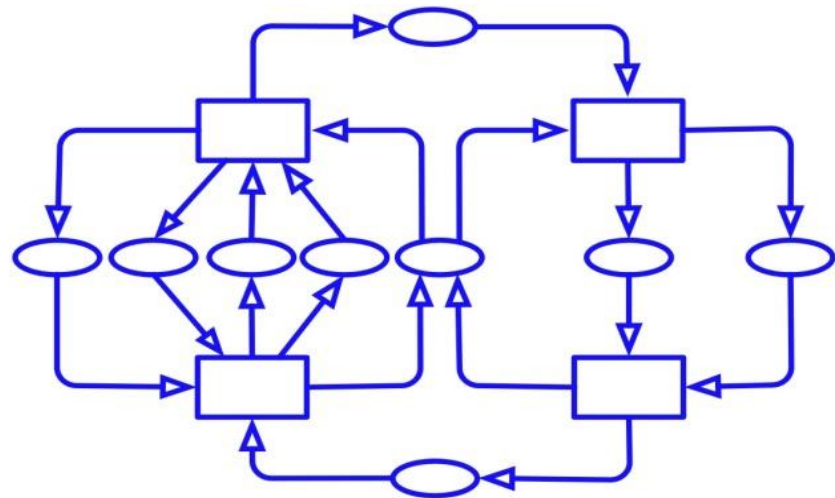# The Petri Net Community Today (including statistics)

Maciej Koutny

**School of Computing
Newcastle University
United Kingdom**

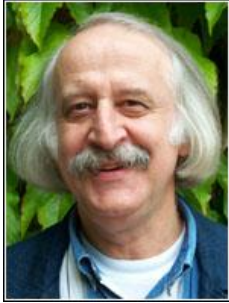
Petri Nets 40th Birthday !

Aachen 2019

A community ?

Helping the community

3

Grzegorz Rozenberg

Petri Net Course

☐ The course takes place
Sunday, Monday and *Tuesday*

☐ Lectures on:

- Basic Net Classes

- Coloured Petri Nets

- Timed and Stochastic Petri Nets

- Applications of Petri Nets (vary from year to year)

☐ If all four parts are followed, *3 ECTS credits* can be obtained by *PhD students*
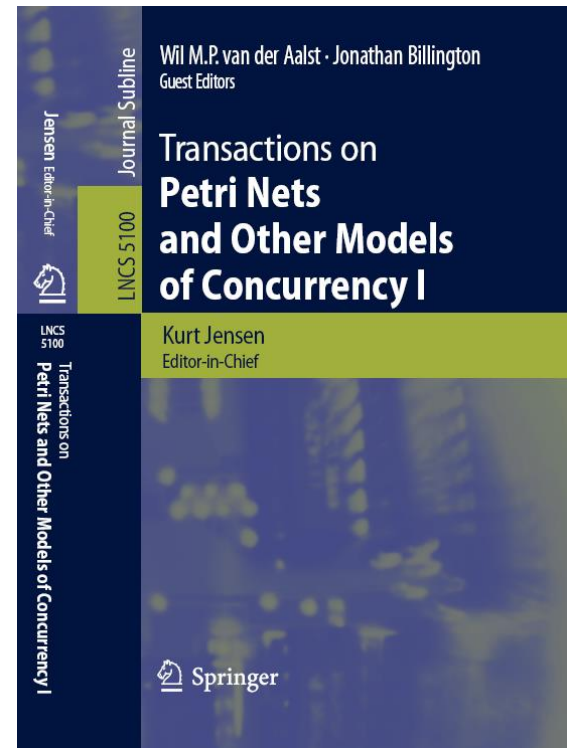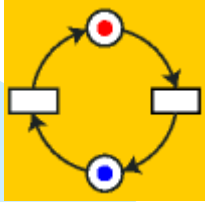
ToPNoC

From workshops:

- Siedlce (Vol I)
- Xi'an (Vol III)
- Paris (Vol IV)
- Braga (Vol V)
- Newcastle (Vol VI)
- Hamburg (Vol VIII)
- Milano (Vol IX)
- Tunis (Vol X)
- Brussels (Vol XI)
- Torun (Vol XII)
- Zaragoza (Vol XIII)
- Bratislava (Vol XIV, to appear soon)

Topical volumes:

- Process Aware Information Systems (Vol II)
- Networks, Protocols and Services (Vol VI)
- Advanced Course in Rostock (Vol VII)

Wil M.P. van der Aalst · Jonathan Billington
Guest Editors

Transactions on
**Petri Nets
and Other Models
of Concurrency I**

Kurt Jensen
Editor-in-Chief

LNCS 5100

Jensen Editor-in-Chief

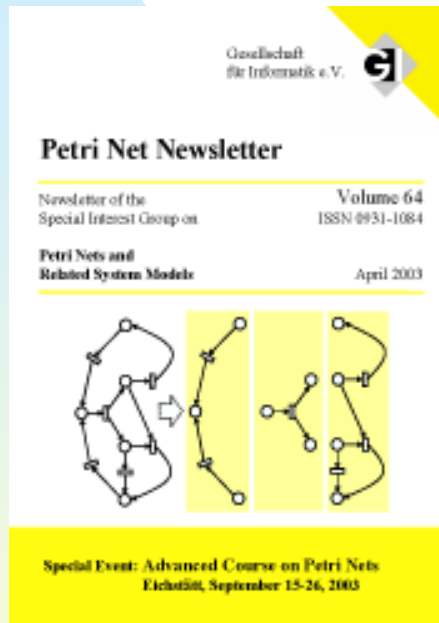Journal Subline

Springer

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Petri Nets World (web & mail)

- Provides a variety of online services for the international Petri Nets community

- Contains information about all activities within the Petri net community

- The site is maintained by the TGI group at the University of Hamburg, Germany

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Petri Net Newsletter

- Newsletter of the Special Interest Group on
  Petri Nets and Related System Models

Gesellschaft
für Informatik e.V.

Petri Net Newsletter

Newsletter of the
Special Interest Group on

Volume 64
ISSN 0931-1084

**Petri Nets and
Related System Models**

April 2003

**Special Event: Advanced Course on Petri Nets
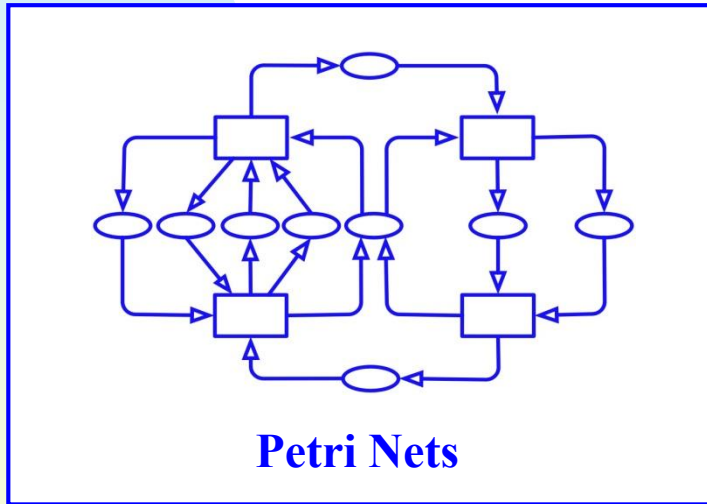Eichstätt, September 15-26, 2003**

- Refereed technical contributions including surveys and state-of-the-art-reports

- Work in progress including problems and puzzles

- Conference announcements, programs and reports

- Reports on departments, institutes, companies, projects, local activities

  https://www.informatik.uni-augsburg.de/pnnl/

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Petri Net Flags and Treats

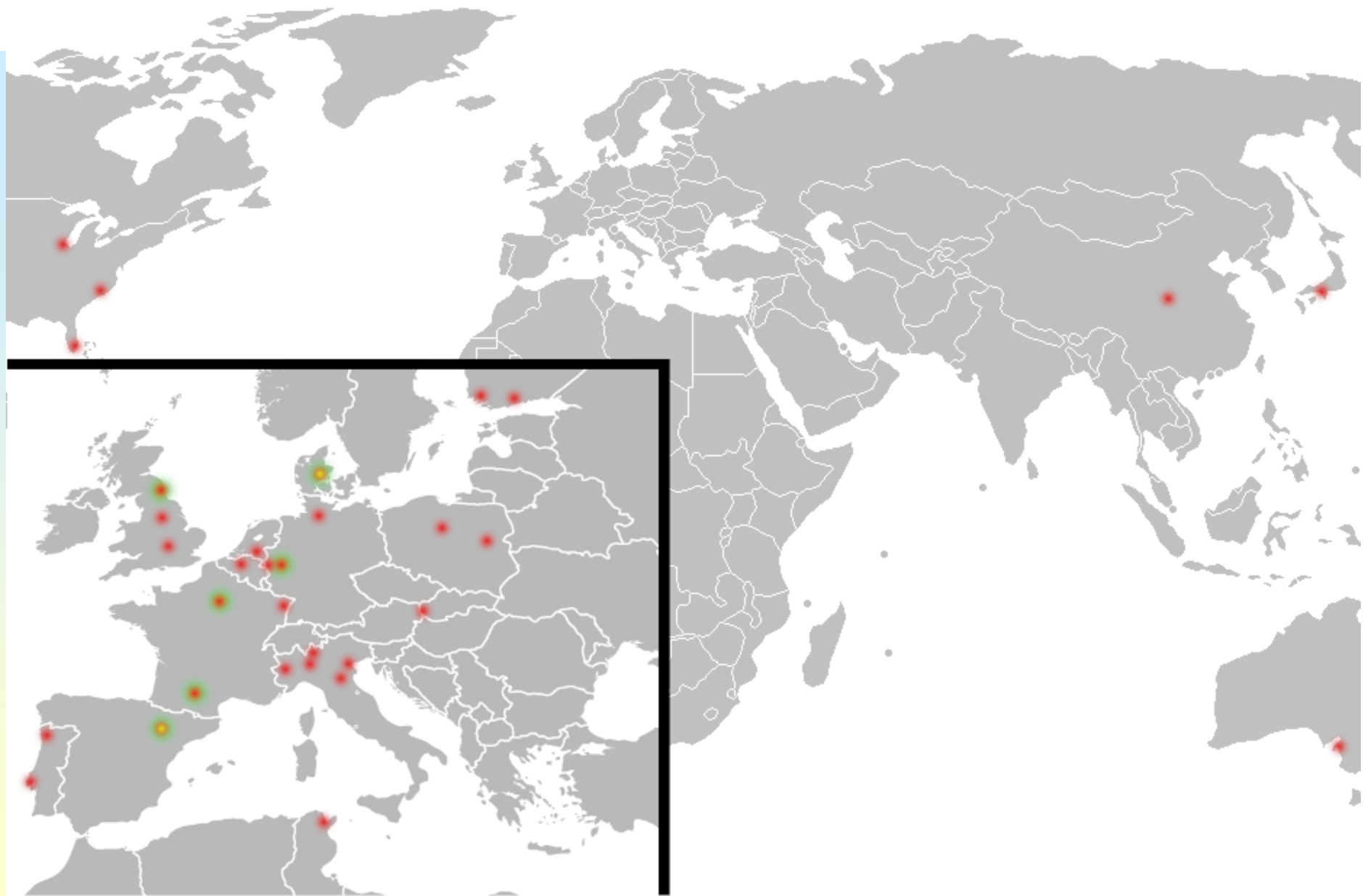**Petri Nets**

Since 1991: ***28 times***.

Since 1984: ***35 times***.

Indirect benefits of PETRI NETS

- New research collaborations
- Arranging research visits
- Sending PhD students
- New research projects
- Jointly writing books
- Discovering new research areas
- Discovering new theoretical problems
- …

A community indeed !

Conferences & PC Chairs

- Strasbourg 1980
- Bad Honnef 1981 W.Reisig
- Varenna 1982 G.Rozenberg
- Touluse 1983 H.Genrich
- Aarhus 1984 G.Roucairol
- Espoo 1985 K.Jensen
- Oxford 1986 M.Diaz
- Zaragoza 1987 K.Voss
- Venice 1988 D.Simpson
- Bonn 1989 G.De Michelis
- Paris 1990 R.Valk
- Aarhus 1991 M.Silva
- Sheffield 1992 K.Jensen
- Chicago 1993 M.Ajmone-Marsan
- Zaragoza 1994 R.Valette
- Torino 1995 G.de Micheles, M.Diaz
- Osaka 1996 W.Reisig, J.Billington
- Toulouse 1997 P.Azema, G.Balbo
- Lisbon 1998 J.Desel, M.Silva
- Williamsburg 1999 J.Kleijn, S.Donatelli

- Aarhus 2000 M.Nielsen, D.Simpson
- Newcastle 2001 M.Koutny, J.M.Colom
- Adelaide 2002 J.Esparza, C.Lakos
- Eindhoven 2003 E.Best, W.van der Aalst
- Bologna 2004 W.Reisig, J.Cortadella
- Miami 2005 Ph.Darondeau, G.Ciardo
- Turku 2006 S.Donatelli, PS.Thiagarajan
- Siedlce 2007 J.Kleijn, A.Yakovlev
- Xi'an 2008 K.van Hee , R.Valk
- Paris 2009 G.Franceschinis, K.Wolf
- Braga 2010 J.Lilius, W.Penczek
- Newcastle 2011 L.Petrucci, L.M.Kristensen
- Hamburg 2012 S.Haddad, L.Pomello
- Milano 2013 J.M.Colom, J.Desel
- Tunis 2014 E.Kindler, G.Ciardo
- Brussels 2015 R.Devillers, A.Valmari
- Torun 2016 F.Kordon, D.Moldt
- Zaragoza 2017 W.van der Aalst, E.Best
- Bratislava 2018 V.Khomenko, O.H.Roux
- Aachen 2019 S.Donatelli, S.Haar

Program Committee memebers

- W.van der Aalst
- M.Ajmone-Marsan
- H.Alla
- E.Amparore
- C.Andre
- P.Azema
- G.F.Balbo
- P.Baldan
- K.Barkaoui
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- G.DegliAntoni
- I.Demongodin
- J.Desel
- A.Desrochers
- R.Devillers

- M.Diaz
- S.Donatelli
- Z.Duan
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- M.Jantzen
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- K.Jensen
- C.Jiang
- G.Juanole
- G.Juhas
- J.Julvez
- A.Kalenkova
- J.-P.Katoen

- P.Kemper
- V.Khomenko
- E.Kindler
- H.Klaudel
- J.Kleijn
- S.Kodama
- M.Koehler-Bussmeier
- F.Kordon
- V.Kotov
- M.Koutny
- L.M.Kristensen
- B.Krogh
- S.Kumagai
- C.Lakos
- G.Lanzarone
- P.Lauer
- K.Lautenbach
- R.Lazic
- A.Levis
- Z.Li
- J.Lilius
- C.Lin
- C.Lindemann
- M.Lindqvist
- N.Lohmann
- I.Lomazova
- R.Lorenz
- J.Luo
- J.Martínez
- H.Matsuno
- A.Mazurkiewicz
- G.DeMichelis
- G.Memmi
- J.F.Meyer
- R.Meyer
- L.Mikulski
- A.Miner
- T.Miyamoto
- D.Moldt
- M.Molloy
- P.Moreaux
- M.Mukund
- H.Mueller
- T.Murata
- S.Natkin

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- G.Nutt
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- T.Onaga
- A.Pagnoni
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- L.Petrucci
- L.Pinna
- P.Poizat
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- L.Pomello
- R.Razouk
- L.Recalde
- W.Reisig
- P-A.Reynier
- R.Robbana
- G.Roucairol
- O-H.Roux
- G.Rozenberg
- B.Rozoy
- W.Sanders
- A.Sangnier
- V.Sassone
- H.Schmidt
- S.Schmitz
- E.Schnieder
- S.Schwoon
- C.Seatzu
- R.Shapiro
- Z.Shan
- S.Shatz
- M.Shields
- N.Sidorova
- J.Sifakis
- M.Silva
- C.Simone
- D.Simpson
- P.Sobocinski
- C.Stahl
- P.Starke
- D.Stotts
- S.Taoka
- E.Teruel
- PS.Thiagarajan

- Y.Thierry-Mieg
- K.Trivedi
- K.Tsuji
- T.Ushio
- V.Valero
- R.Valette
- R.Valk
- A.Valmari
- J.Vautherin
- F.Vernadat
- E.Vicario
- G.Vidal-Naquet
- I.Virbitskaite
- W.Vogler
- H.Voelzer
- K.Voss
- M.Weidlich
- M.Westergaard
- G.Wheeler
- J.Winkowski
- G.Winskel
- K.Wolf
- M.Woodside
- A.Yakovlov
- M.Zhou
- W.Zuberek

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PC members : 24 countries

Country	
□ Australia	5
□ Belgium	2
□ Brazil	1
□ Canada	5
□ China	6
□ Czech Republic	2
□ Denmark	4
□ Finland	6
□ France	37
□ Germany	30
□ India	2
□ Italy	28

Country	
□ Japan	10
□ Netherlands	11
□ Norway	1
□ Poland	6
□ Portugal	2
□ Russia	4
□ Slovak Republic	1
□ Spain	10
□ Switzerland	2
□ Tunisia	1
□ UK	12
□ USA	18

206	total number of PC members
918	total number of PC participations
4.4	average number of participations
3	most frequent number of participations
16	highest number of participations

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Workshops

- Case Studies
- CSCW
- Object Orientation
- Manufacturing
- Multimedia
- Work Flow Management
- Hardware Design
- Intelligent Systems
- Software Engineering
- Practical Use of High-level Nets
- Synthesis of Concurrent Systems
- Dependable Computing
- Defence Systems
- Discrete Event Systems Control
- Security Issues
- Token Based Computing
- Petri Net Interchange Format
- Coordination and Workflow
- Control of Hybrid and Discrete Event Systems
- Teaching Concurrency
- Petri Net Standards
- Business Processes and Web Services
- Unfolding and partial order techniques
- Concurrency Methods
- Distributed Systems
- Process Mining and Petri net Synthesis
- Agile Automation

- Software Engineering
- Organisational Modelling
- Timing and Stochasticity
- Abstractions
- Biological Processes
- Region Theory
- Abstractions & Model Checking
- Software Engineering
- Biological Processes
- Region Theory
- Petri Nets Compositions
- Model Checking
- Petri Nets and Software Engineering
- Biological Processes and Petri Nets
- Petri Net-based Security
- Logics, Agents, and Mobility
- Petri Nets and Software Engineering
- Biological Processes & Petri Nets
- Modeling and Business Environments
- Formal Methods for Security
- Petri Nets for Adaptive Discrete-Event Control Systems
- Algorithms & Theories for the Analysis of Event Data
- Structure Theory of Petri Nets

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Advanced Tutorials

- AI and Computer Integrated Manufacturing
- Different Models of Concurrency
- Communication Protocols
- Condensed State Spaces
- Scheduling
- Distributed Algorithms
- Logics for Concurrency
- State Explosion
- Production Systems
- Performance Analysis
- Timed and Hybrid Automata
- Probabilistic Methods
- Model Checking
- Coordination
- Discrete Event Systems Control
- Biological Pathways
- Scenario based methods for system design
- Model driven architecture
- Bounded Model Checking
- Nanoscale Circuits & Cellular Automata
- Quantum Computing
- Modelling of Business Processes
- Elasticity and Petri nets: Paradigms for nanoelectronics
- Stochastic Petri Nets for Discrete-Event Simulation
- Time Petri Nets
- Deadlock Control Methods

- Petri Net Markup Language
- Continuous Petri Nets
- Decision Diagrams
- State Space Exploration
- Petri Net Markup Language
- Elementary Net Synthesis
- Verification with LoLA
- Theory and Applications of Petri Net Unfoldings
- Fluid & Hybrid Petri Nets
- Unfoldings
- Petri Nets for Multiscale Systems Biology
- Nets, Physics and Coordination
- Petri nets for Multiscale Systems Biology
- From Symmetric Nets to SymmetricNets with Bags
- Petri nets for Multiscale Systems Biology
- Modelling, Synthesis and Verification of Hardware
- Parametric Verification
- A Tour In Process Mining: From Practice to Algorithmic Challenges
- Parametric Verification
- Model Checking for Petri Nets From Algorithms to Technology
- Model-based Software Engineering for/with Petri Nets
- BioModel Engineering
- Evaluating Software Architectures

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Invited Speakers

- H.Mueller
- M.Nivat
- M.Diaz
- A.Mazurkiewicz
- M.Nielsen
- A.Holt
- R.Milner
- F.Krueckeberg
- C.A.Petri
- G.Berry
- P.S.Thiagarajan
- M.Ajmone-Marsan
- R.Shephard
- K.Jensen
- C.A.Petri
- A.Pnueli
- H.Genrich
- C.Girault
- E.R.Olderog
- J.Billington
- W.Damm
- G.Wins
- G.Balbo
- M.Hennessy
- J.Sifakis
- B.Tonti
- D.Harel
- G.Juhas
- T.Yoneda

- W.Reisig
- C.A.Ellis
- M.Silva
- K.S.Trivedi
- E.Clarke
- F.DiCesare
- U.Montanari
- E.Best
- F.Mattern
- K.Voss
- G.Agha
- T.Murata
- A.Valmari
- J.Esparza
- J.Sifakis
- R.Valette
- A.Arnold
- G.Chiola
- R.Valk
- B.Krogh
- G.de Michelis
- P.Varaiya
- J.Cortadella
- Ph.Darondeau
- B.Courtois
- G.Juhas
- G.Rozenberg
- L.M.Kristensen
- M.Vardi
- Ch.Baier
- S.A.Edwards

- G.Engels
- S.Haddad
- K.G.Larsen
- O.L.Madsen
- S.Donatelli
- G.Holzmann
- J.Kramer
- R.Milner
- M.Nielsen
- A.Sangiovanni-Vincentelli
- W.van der Aalst
- J.Desel
- I.Hayes
- C.Lakos
- P.S.Thiagarajan
- A.Yakovlev
- M.Ajmone-Marsan
- E.Brinksma
- J.M.Colom
- C.Ellis
- K.Jensen
- S.Miyano
- G.Ciardo
- M.Kishinevsky
- H.Lin
- M.Koutny
- K.G.Larsen
- A.Finkel
- C.A.R.Hoare

- J.Cortadella
- R.Gorrieri
- T.Henzinger
- W.Penczek
- L.Pomello
- B.Sanders
- F.Curbera
- G.Franceschinis
- K.McMillan
- C.A.Petri
- M.Silva
- J.Wing
- R.-J.Back
- J.Campos
- N.Halbwachs
- A.Jantsch
- E.Kindler
- J.Xu
- S.Abramsky
- S.Kumagai
- A.Mazurkiewicz
- A.Tarlecki
- K.Wolf
- G.Alonso
- D.Du
- A.Giua
- M.Heiner
- B.Randell
- D.Fahland
- P.Tsigas

- W.Vogler
- B.Jacobs
- J.-P.Katoen
- J.Sparso
- K.van Hee
- K.Jensen
- S.Lafortune
- C.Palamidessi
- M.Latapy
- K.Lautenbach
- W.M.Wonham
- A.Brown
- M.Dumas
- M.Kwiatkowska
- R.Lorenz
- M.Broy
- I.Foster
- J.Kleijn
- S.Lasota
- P.Wadler
- J.Carmona
- C.G.Cassandras
- T.A.Henzinger
- T.Hildebrandt
- I.Lomazova
- B.Steffen
- M.Fugger
- O.Grumberg
- F.Kordon
- L.Cardelli

Distinguished C.A.Petri Speakers

- D.Harel   Braga   2010
- B.Randell   Newcastle   2011
- C.A.R.Hoare   Hamburg   2012
- M.Vardi   Milano   2013
- W.M.Wonham   Tunis   2014
- M.Rabin   Brussels   2015
- I.Foster   Torun   2016
- T.A.Henzinger,   Zaragoza   2017
- O.Grumberg   Bratislava   2018
- L.Cardelli   Aachen   2019

Outstanding paper awards

- Ph.Darondeau, M.Koutny, M.Pietkiewicz-Koutny and A.Yakovlev

- F.Rosa-Velardo and D.de Frutos-Escrig

- A.Valmari and H.Hansen

- S.Haddad, J.Mairesse and H.-T.Nguyen

- A.Valmari and H.Hansen

- E.Fraca and S.Haddad

- A.Carraro and P.Baldan

- M.Triebel and J.Surmeli

- J.Sroka, A.Kierzek and W.Ptak

- A.E.Dalsgaard, S.Enevoldsen, P.Fogh, L.S.Jensen, T.S.Jepsen, I.Kaufmann, K.G.Larsen, S.M.Nielsen, M.C.Olesen, S.Pastva and J.Srba

- W.van der Aalst

- C.Weil-Kennedy, M.Raskin and J.Esparza

A working model

- True to its origin as model for real applications

- Motivated and stimulated a very fruitful domain of theoretical research

- Process mining

- Modelling VLSI circuits (STGs)

- Modelling industrial processes (workflows)

- Tools for verification of concurrent systems

- Synthesising concurrent systems from behavioural specifications

- Bioinformatics

- Robotics

- Education: to explain concepts and ideas of concurrency

- …

True concurrency

- Petri nets as "UML" for reasoning about concurrency

- Most of computers are now multi core

- Sequential processes can be differently aligned in time running on their respective cores

- Theories based on partial orders

- Several strong theoretical results in the area of representation of program as products of sequential subsystems

- User friendly interface for formal theoretical results

- Relating static structure to dynamic behaviour

Structure theory

A bit of DBLP search

Titles include "Petri net" or "Petri nets"

- Total: 8,534
- Conference and Workshop Papers: 5,182
- Journal Articles: 2,846
- Books and Theses: 182
- Editorship: 101
- Parts in Books or Collections: 70
- Informal Publications: 144

A bit of DBLP search

Titles include "Petri net" or "Petri nets" (refined by year)

- 2019:   150
- 2018:   368
- 2017:   326
- 2016:   405
- 2015:   401

A bit of DBLP search

Titles include "Petri net" and "Petri nets" (top venues out of 2,888)

- ☐ IEEE International Conference on Systems, Man, and Cybernetics

- ☐ Petri Nets

- ☐ Application and Theory of Petri Nets

- ☐ ICATPN

- ☐ Petri Nets and Performance Models

- ☐ Fundamenta Informaticae

- ☐ International Conference on Robotics and Automation

- ☐ Trans. Petri Nets and Other Models of Concurrency

- ☐ Petri Nets and Software Engineering

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Recent journal articles

- An Efficient Deadlock Recovery Policy for Flexible Manufacturing Systems Modeled With Petri Nets
- A Deadlock Prevention Policy for Flexible Manufacturing Systems Modeled With Petri Nets Using Structural Analysis
- A Model Repair Approach Based on Petri Nets by Constructing Free-Loop Structures
- Architecture Modelling and Task Scheduling of an Integrated Parallel CNC System in Docker Containers Based on Colored Petri Nets
- A Novel Failure Mode and Effect Analysis Approach Integrating Probabilistic Linguistic Term Sets and Fuzzy Petri Nets
- Research on Situation Awareness of Airport Operation Based on Petri Nets
- Minimum Initial Marking Estimation in Labeled Petri Nets With Unobservable Transitions
- C-Exact Hypergraphs in Concurrency and Sequentiality Analyses of Cyber-Physical Systems Specified by Safe Petri Nets
- The Internet of Things Enabled Shop Floor Scheduling and Process Control Method Based on Petri Nets
- A Method for Repairing Process Models Containing a Choice With Concurrency Structure by Using Logic Petri Nets
- Fuzzy spatio-temporal ontologies and formal construction based on fuzzy Petri nets

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Happy Birthday PETRI NETS !