KRZYSZTOF RZĄDCA

EDUCATION

2015	Habilitation (HDR) in Computer Science: *Resource Management in Organizationally-Distributed Systems*; University of Warsaw, Poland.
2008	PhD in Computer Science: *Resource Management Models and Algorithms for Multi-Organizational Grids* Advisors: Franciszek Seredyński (PJIIT), Denis Trystram (INPG)
2004–2007	Institut National Polytechnique de Grenoble (INPG), École Nationale Supérieure d'Informatique et de Mathématiques Appliquées de Grenoble (ENSIMAG), France and Polish-Japanese Institute of Information Technology (PJIIT) Joint (*co-tutelle*) PhD studies; graduated with two PhD diplomas, a Polish and a French one.
2004	Master Thesis: *Data clustering algorithms* First class honors (*ocena celująca*). Second prize in the contest organized by the Polish Information Processing Society. Advisor: dr hab. Franciszek Seredyński
2002-2003	Universitat de Valencia, Spain, Faculty of Computer Science. Socrates-Erasmus European scholarship.
1998–2004	Warsaw University of Technology, Poland, Faculty of Electronics and Information Technology.

PROFESSIONAL EXPERIENCE

10.2020–current	Google Poland: Data Science Lead
10.2018–09.2020	Google Poland: Visiting Researcher
10.2017–current	Institute of Informatics, University of Warsaw, Poland: Associate Professor Prinicpal Investigator in a 850k PLN (200k EUR) grant awarded by the Polish National Science Center on data center and HPC resource management (2018-2020).
10.2010–09.2017	Institute of Informatics, University of Warsaw, Poland: Assistant Professor Prinicpal Investigator in a 350k PLN (80k EUR) grant awarded by the Polish National Science Center on scheduling and resource management (2013-2017). Principal Investigator in a 300k PLN (75k EUR) grant awarded by the Fundation for Polish Science on distributed storage systems (2011-2013).
10.2008–03.2010	Nanyang Technological University, Singapore: Research Fellow Postdoctoral training in Anwitaman Datta's team.
02.2004–09.2008	Polish-Japanese Institute of Information Technology (Warsaw, Poland): Teaching Assistant (leave of absence during stays in Grenoble, France: 09.2004-09.2005, 10.2006-09.2007)
02.2004–08.2004	Enabled Minds LLC (Warsaw, Poland and Portland, ME, USA): developer
03.2003–07.2003	LC Ingeniería (Valencia, Spain): Java/web developer (internship)

Prizes, Awards and Scholarships

2018–2021	National Science Center (Poland): Opus grant (UMO-2017/25/B/ST6/00116), Principal Investigator
05.2016	International Foundation for Autonomous Agents and Multiagent Systems (IFAAMAS): co-advisor of Piotr Skowron's PhD thesis that won the runner-up of 2015 IFAAMAS Victor Lesser Distinguished Dissertation Award
01.2016-12.2017	Polish Ministry of Science and Higher Education: Polonium grant, coordinator (French-Polish cooperation programme; French coordinator: dr Fanny Pascual, LIP6, UPMC-Sorbonne Universités)
02.2015	Google Faculty Research Award: Principal Investigator
01.2014–12.2016	National Science Center (Poland): Preludium grant (UMO-2013/09/N/ST6/03661), tutor (Principal Investigator: Piotr Skowron)
07.2013–12.2017	National Science Center (Poland): Sonata grant (UMO-2012/07/D/ST6/02440), Principal Investigator
01.2012–12.2013	Polish Ministry of Science and Higher Education: Polonium grant, coordinator (French-Polish cooperation programme; French coordinator: prof. Denis Trystram, Grenoble University)
10.2011–09.2014	Polish Ministry of Science and Higher Education: scholarship for young researchers
05.2011–07.2013	Foundation for Polish Science: Homing Plus grant (HOMING PLUS/2010-2/13), Principal Investigator
10.2010–09.2011	University of Warsaw: Scholarship for young PhD researchers (Modern University Project)
2008	PJIIT: PhD thesis with first class honors
03.2007–07.2007	Égide PhD scholarship (granted by Égide, an agency of the French government)
10.2004–02.2007	French government fellowship recipient, *co-tutelle* PhD scholarship (*boursier du gouvernement français*)
2004	Procter & Gamble Best Polish Student Award: Winner of the competition for the best Polish graduate in 2004
2004	Polish Information Processing Society (2004): 2nd prize in the contest for the best computer science master thesis in Poland
10.2002–02.2003	European Socrates-Erasmus Scholarship (Universitat de Valencia, Spain)
10.1999–02.2003	Scholarship for exceptional academic achievements from Warsaw University of Technology.

Grants (Principal Investigator)

2018–2021   Optimization Methods for Allocation of Large-Scale Computational Resources
Supported by the Polish National Science Center through a Opus grant.
The objective of the project is to develop theoretically-sound and effective solutions in scheduling and resource management for large-scale computational resources — supercomputers and data centers.

07.2013–12.2017   Resource management for datacenters and supercomputers
`mimuw.edu.pl/~krzadca/kassate/`
Supported by the Polish National Science Center through a Sonata grant.
The objective of the project is to develop mathematical models of resource management in modern computing systems; fair and efficient algorithms; and prototype implementations of the scheduling software.
OStrich, a scheduler we developed for the SLURM supercomputer management software, is used by the Hydra supercomputer (262 nodes, 5056 cores) of the Warsaw academic supercomputer center (ICM) since July 2014.

05.2011–07.2013   Nebulostore: a p2p storage system
`nebulostore.org`
Supported by the Foundation for Polish Science through a Homing Plus grant.
The goal of the project was to develop relevant theory, algorithms and a prototype implementation of an Internet-scale, peer-to-peer storage system suitable for various applications, including distributed online social networks.
The project's results include algorithms for multi-agent resource management (published at SPAA, IPDPSW and ACM TAAS); and a prototype implementation of the distributed data storage software.

Teaching Experience

Univeristy of Warsaw, Poland

Course: High Performance Computing (30 hours lectures, 30 hours labs), Master level
Lectured the course. Designed the curriculum. Prepared course materials.
Course: Parallel and Distributed Programming (30 hours lectures, 30 hours tutorials, 30 hours labs), Master level
Lectured the course. Redesigned and updated the curriculum. Prepared course materials.

Advising PhD students:
Co-advised Piotr Skowron's PhD (defended in 2015 with distinction).
Advising Paweł Żuk (10.2017-)

Advising Master projects:
Supervised 17 defended MSc theses.

Taught tutorials and labs in the following undergraduate courses: Operating Systems, Security of Computer Systems, Computer Networks.

Invited Lectures

Cooperation in Scheduling: Spring School on Algorithmic Game Theory (with Denis Trystram)
(Université Sorbonne-Paris 6, June 2012)

NANYANG TECHNOLOGICAL UNIVERSITY, SINGAPORE

Co-supervised two final year projects of undergraduate students

INSTITUT NATIONAL POLYTECHNIQUE DE GRENOBLE, ÉCOLE NATIONALE SUPÉRIEURE DE GÉNIE INDUSTRIEL, FRANCE

Course: Systems and data bases (30 hours)
Course taught only as tutorials. Participated in syllabus preparation. Prepared course materials. Taught the course (in French).

POLISH-JAPANESE INSTITUTE OF INFORMATION TECHNOLOGY

Advised four defended BSc (final year) projects.
Taught tutorials and labs in the following undergraduate courses: Computer Networks, Advanced Computer Networks, Security of Information Systems, Operating Systems.

ENGAGEMENT FOR SCIENTIFIC COMMUNITY

MEMBER OF TECHNICAL PROGRAM COMMITTEES

- Euro-Par: 2016, 2018 (resource management track co-chair), 2020 (general co-chair).
- Supercomputing (SC): 2016, 2017, 2019, 2021
- IEEE International Parallel & Distributed Processing Symposium (IPDPS): 2013, 2014, 2016, 2019, 2021
- International Joint Conference on Artificial Intelligence (IJCAI): 2015, 2016, 2017
- AAAI Conference on Artificial Intelligence: 2018
- International Conference on Parallel Processing (ICPP): 2017
- IEEE International Conference on High Performance Computing (HiPC): 2013, 2014, 2015, 2016
- Workshop on Scheduling For Parallel Computing (SPC), in conjunction with the International Conference on Parallel Processing and Applied Mathematics PPAM: 2013, 2015, 2017
- BeyondMR / Scalable Workflow Enactment Engines and Technologies (SWEET), in conjunction with SIGMOD: 2013, 2014, 2016, 2017, 2018
- IEEE GLOBECOM: 2015
- IEEE Consumer Communications & Networking Conference (CCNC), Peer-to-Peer Networking and Content Distribution track: 2012, 2013
- International Workshop on Hot Topics in Peer-to-Peer Systems (organized with IEEE International Parallel & Distributed Processing Symposium, IPDPS): 2009, 2010, 2011
- International Conference on Peer-to-Peer Computing (P2P): 2009

REVIEWER FOR GRANT PROPOSALS

- Engineering and Physical Sciences Research Council (UK)
- Agence National de la Recherche (France)
- IDEX Université Grenoble Alpes (France)
- National Science Center (Poland)

REVIEWER FOR JOURNALS

IEEE Transactions on Parallel and Distributed Systems, IEEE Intelligent Systems, IEEE Transactions on Cybernetics, IEEE Transactions on Cloud Computing, Computers and Informatics, IEEE Transactions on Mobile Computing, IEEE Transactions on Computers, ACM Transactions on Autonomous and Adaptive Systems, IEEE Transactions on Industrial Electronics, Concurrency&Computation: Practice and

Experience, Journal of Parallel and Distributed Computing (Springer), Journal of Scheduling (Springer), Peer-to-Peer Networking and Applications (Springer), Future Generation Computer Systems (Elsevier), Quarterly Journal of Operations Research (Springer), Distributed and Parallel Databases (Springer), Electronic Commerce Research and Applications (Elsevier), The Institute of Electronics, Information and Communication Engineers (IEICE) Transactions, Computers&Operations Research (Elsevier), Information Processing Letters (Elsevier), Information Sciences (Elsevier), Fundamenta Informaticae, Parallel Processing Letters

Reviewer for conferences

EuroPar 2005, HiPC 2005, SBAC 2005, IFIP 2005, IFIP 2006, GPC 2007, WCCI 2008, P2P 2008, SocInfo 2009, SPAA 2009, HotP2P 2009, P2P 2009, CCNC 2010, HotP2P 2010, ICDCS 2010, AINA 2011, HotP2P 2011, CCNC 2012, Euro-Par 2012, CCNC 2013, IPDPS 2013, PST 2013, SPT 2013, SWEET 2013, IPDPS 2014, HIPC 2014, IPDPS 2015, Euro-Par 2015, IJCAI 2015, HiPC 2015, IPDPS 2016.

Publications

Refereed Journals

Kott, A., Théron, P., Mancini, L. V., Dushku, E., Panico, A., Drašar, M., LeBlanc, B., Losiewicz, P., Guarino, A., Pihelgas, M., and Rzadca, K. (2020). An introductory preview of autonomous intelligent cyber-defense agent reference architecture, release 2.0. *The Journal of Defense Modeling and Simulation*, 17(1):51–54

Pascual, F. and Rzadca, K. (2019). Optimizing egalitarian performance when colocating tasks with types for cloud data center resource management. *IEEE Transactions on Parallel and Distributed Systems*, 30(11):2523–2535

Pascual, F. and Rzadca, K. (2018). Colocating tasks in data centers using a side-effects performance model. *European Journal of Operational Research*, 268(2):450–462

Skowron, P., Rzadca, K., and Datta, A. (2017). Cooperation and competition when bidding for complex projects: Centralized and decentralized perspectives. *IEEE Intelligent Systems*, 32(1):17–23

Skowron, P. and Rzadca, K. (2016). Flexible replica placement for optimized p2p backup on heterogeneous, unreliable machines. *Concurrency and Computation: Practice and Experience*, 28(7):2166–2186

Rzadca, K., Datta, A., Kreitz, G., and Buchegger, S. (2015). Game-theoretic mechanisms to increase data availability in decentralized storage systems. *ACM Transactions on Autonomous and Adaptive Systems*, 10(3):14:1–14:32

Xin, L., Datta, A., and Rzadca, K. (2013). Trust beyond reputation: A computational trust model based on stereotypes. *Electronic Commerce Research and Applications*, 12:24–39

Dutot, P.-F., Pascual, F., Rzadca, K., and Trystram, D. (2011). Approximation algorithms for the multi-organization scheduling problem. *IEEE Transactions on Parallel and Distributed Systems*, 22:1888–1895

Rzadca, K., Tan Teck, J., and Datta, A. (2010b). Multi-objective optimization of multicast overlay for collaborative applications. *Computer Networks*, 54(12):1986–2005

Pascual, F., Rzadca, K., and Trystram, D. (2009). Cooperation in multi-organization scheduling. *Concurrency&Computation: Practice and Experience*, 21:905–921

Rzadca, K. and Trystram, D. (2009). Promoting cooperation in selfish computational grids. *European Journal of Operational Research*, 199:647–657

Refered Book Chapters

Théron, P., Kott, A., Drašar, M., Rzadca, K., LeBlanc, B., Pihelgas, M., Mancini, L., and de Gaspari, F. (2020). Reference architecture of an autonomous agent for cyber defense of complex military systems. In *Adaptive Autonomous Secure Cyber Systems*, pages 1–21. Springer

Datta, A., Buchegger, S., Vu, L.-H., Thornsten, S., and Rzadca, K. (2011). Decentralized online social networks. In Furht, B., editor, *Handbook of Social Network Technologies and Applications*, pages 349–378. Springer

Hupa, A., Rzadca, K., Wierzbicki, A., and Datta, A. (2010). Interdisciplinary matchmaking: Choosing collaborators by skill, acquaintance and trust. In Abraham, A., Hassanien, A.-E., and Snasel, V., editors, *Computational Social Network Analysis*, Computer Communication and Networks, pages 319–347. Springer

Datta, A., Rzadca, K., Ang, S., and Hong, G. C. (2010). Serverless social software for nomadic collaboration. In Murugan, A., editor, *e-Research Collaboration: Theory, Techniques and Challenges*, pages 85–103. Springer, New York Dordrecht Heidelberg London

Wierzbicki, A., Datta, A., Zaczek, L., and Rzadca, K. (2010). Supporting collaboration and creativity through mobile p2p computing. In Shen, X., Yu, H., Buford, J., and Akon, M., editors, *Handbook of Peer-to-Peer Networking*, pages 1367–1400. Springer

Dutot, P.-F., Rzadca, K., Saule, E., and Trystram, D. (2009). Multi-objective scheduling. In Robert, Y. and Vivien, F., editors, *Introduction to Scheduling*, Computational Science, pages 219–251. Chapman & Hall/CRC

Refered Conference Proceedings

Kopanski, J. and Rzadca, K. (2021). Plan-based job scheduling for supercomputers with shared burst buffers. In *Euro-Par '21 Proceedings: 27th International European Conference on Parallel and Distributed Computing (accepted)*. Springer (28% acceptance ratio)

Naruszko, A., Przybylski, B., and Rzadca, K. (2021). A log-linear (2+5/6)-approximation algorithm for parallel machine scheduling with a single orthogonal resource. In *Euro-Par '21 Proceedings: 27th International European Conference on Parallel and Distributed Computing (accepted)*. Springer (28% acceptance ratio)

Przybylski, B., Zuk, P., and Rzadca, K. (2021). Data-driven scheduling in serverless computing to reduce response time. In *CCGrid '21 Proceedings: 21th IEEE/ACM International Symposium on Cluster, Cloud and Internet Computing* (26% acceptance ratio)

Bashir, N., Deng, N., Rzadca, K., Irwin, D. E., Kodak, S., and Jnagal, R. (2021). Take it to the limit: peak prediction-driven resource overcommitment in datacenters. In *EuroSys '21: Proceedings of the Sixteenth EuroSys Conference*, pages 556–573. ACM (21% acceptance ratio)

Zuk, P. and Rzadca, K. (2020). Scheduling methods to reduce response latency of function as a service. In *32nd IEEE International Symposium on Computer Architecture and High Performance Computing, SBAC-PAD 2020, Porto, Portugal, September 9-11, 2020*, pages 132–140. IEEE (34% acceptance ratio)

Rzadca, K., Findeisen, P., Swiderski, J., Zych, P., Broniek, P., Kusmierek, J., Nowak, P., Strack, B., Hand, S., and Wilkes, J. (2020). Autopilot: workload autoscaling at google. In *EuroSys'20: Proceedings of the Fifteenth EuroSys Conference*. ACM (18% acceptance ratio)

Pascual, F., Rzadca, K., and Skowron, P. (2018). Collective schedules: Scheduling meets computational social choice. In *AAMAS'18*, pages 667–675. IFAAMAS (25% acceptance ratio)

Pacholczyk, M. and Rzadca, K. (2018). Fair non-monetary scheduling in federated clouds. In *Cross-Cloud'18: 5th Workshop on CrossCloud Infrastructures & Platforms, EuroSys'18 Workshops*, pages 3:1–3:6. ACM

Theron, P., Kott, A., Drasar, M., Rzadca, K., LeBlanc, B., Pihelgas, M., Mancini, L., and Panico, A. (2018). Towards an active, autonomous and intelligent cyber defense of military systems: The NATO AICA reference architecture. In *2018 International Conference on Military Communications and Information Systems (ICMCIS)*, pages 1–9. IEEE

Janus, P. and Rzadca, K. (2017). SLO-aware colocation of data center tasks based on instantaneous processor requirements. In *ACM SoCC'17, ACM Symposium on Cloud Computing*, pages 256–268. ACM (23.6% acceptance ratio)

Pascual, F. and Rzadca, K. (2017). Optimizing egalitarian performance in the side-effects model of colocation for data center resource management. In *Euro-Par 2017 Proceedings*, volume 10417 of *LNCS*, pages 206–219. Springer (28.4% acceptance ratio)

Milka, G. and Rzadca, K. (2017). Dfuntest: A testing framework for distributed applications. In *PPAM 2017, International Conference on Parallel Processing and Applied Mathematics*, volume 10777 of *LNCS*. Springer

Skowron, P. and Rzadca, K. (2015). Geographically distributed load balancing with (almost) arbitrary load functions. In *HiPC 2015, 22nd IEEE/ACM International Conference on High Performance Computing*. IEEE (25% acceptance ratio)

Pascual, F. and Rzadca, K. (2015). Partition with side effects. In *HiPC 2015, 22nd IEEE/ACM International Conference on High Performance Computing*. IEEE (25% acceptance ratio)

Georgiou, Y., Glesser, D., Rzadca, K., and Trystram, D. (2015). A scheduler-level incentive mechanism for energy efficiency in HPC. In *CCGrid 2015, 15th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing*, pages 617–626 (25.7% acceptance ratio)

Skowron, P., Rzadca, K., and Datta, A. (2014). People are processors: Coalitional auctions for complex projects (extended abstract). In *AAMAS 2014, 13th International Conference on Autonomous Agents and Multiagent Systems*, pages 1525–1526

Skowron, P. and Rzadca, K. (2014). Fair share is not enough: measuring fairness in scheduling with cooperative game theory. In *PPAM 2013, International Conference on Parallel Processing and Applied Mathematics*, volume 8385 of *LNCS*, pages 38–48. Springer

Emeras, J., Pinheiro, V., Rzadca, K., and Trystram, D. (2014). Ostrich: Fair scheduling for multiple submissions. In *PPAM 2013, International Conference on Parallel Processing and Applied Mathematics*, volume 8385 of *LNCS*, pages 26–37. Springer

Skowron, P. and Rzadca, K. (2013c). Non-monetary fair scheduling — a cooperative game theory approach. In *SPAA 2013, 25th ACM Symposium on Parallelism in Algorithms and Architectures*, pages 288–297. ACM (24% acceptance ratio)

Skowron, P. and Rzadca, K. (2013b). Network delay-aware load balancing in selfish and cooperative distributed systems. In *HCW 2013, 22st International Heterogeneity in Computing Workshop (in conjunction with IPDPS 2013)*, IPDPSW, pages 7–18. IEEE

Skowron, P. and Rzadca, K. (2013a). Exploring heterogeneity of unreliable machines for p2p backup. In *HPCS 2013, International Conference on High Performance Computing & Simulation*, pages 91–98. IEEE

Pinheiro, V., Rzadca, K., and Trystram, D. (2012). Campaign scheduling. In *IEEE International Conference on High Performance Computing (HiPC), Proceedings*, pages 1–10

Rzadca, K., Datta, A., and Buchegger, S. (2010a). Replica placement in p2p storage: Complexity and game theoretic analyses. In *ICDCS 2010, The 30th International Conference on Distributed Computing Systems, Proceedings*, pages 599–609. IEEE Computer Society (14% acceptance ratio)

Ang, S., Rzadca, K., and Datta, A. (2010). Sharedmind: A tool for collaborative mind-mapping. In *Multimedia and Expo (ICME), 2010 IEEE International Conference on*, pages 1154–1155. IEEE

Xin, L., Datta, A., Rzadca, K., and Ee-Peng, L. (2009). Stereotrust: A group based personalized trust model. In *CIKM 2009, The 18th ACM Conference on Information and Knowledge Management, Proceedings*, pages 7–16. ACM Press (14% acceptance ratio)

Rzadca, K., Yong, J. T. T., and Datta, A. (2009). Multicast trees for collaborative applications. In *9th IEEE/ACM International Symposium on Cluster Computing and the Grid, Proceedings*, pages 60–67. IEEE Computer Society (21% acceptance ratio)

Kaszuba, T., Rzadca, K., and Wierzbicki, A. (2008). Discovering the most trusted agents without central control. In *Embedded and Ubiquitous Computing, IEEE/IFIP International Conference on*, volume 2, pages 616–621. IEEE Computer Society

Krystek, M., Kurowski, K., Oleksiak, A., and Rzadca, K. (2008). Comparison of centralized and decentralized scheduling algorithms using gssim simulation environment. In Sergei Gorlatch, P. F. and Priol, T., editors, *Grid Computing: Achievements and Prospects*, pages 185–196. Springer

Rzadca, K. (2007). Scheduling in multi-organization grids: Measuring the inefficiency of decentralization. In *PPAM 2007 Proceedings*, number 4967 in LNCS, pages 1048–1058. Springer

Pascual, F., Rzadca, K., and Trystram, D. (2007). Cooperation in multi-organization scheduling. In *Euro-Par 2007 Proceedings*, volume 4641 of *LNCS*, pages 224–233. Springer. Conference version of [Pascual et al., 2009] (27% acceptance ratio)

Rzadca, K., Trystram, D., and Wierzbicki, A. (2007). Fair game-theoretic resource management in dedicated grids. In *IEEE International Symposium on Cluster Computing and the Grid (CCGRID 2007), Proceedings*. IEEE Computer Society (33% acceptance ratio)

Roeblitz, T. and Rzadca, K. (2006). On the placement of reservations into job schedules. In *Euro-Par 2006 Proceedings*, volume 4128 of *LNCS*, pages 198–210. Springer (38% acceptance ratio)

Rzadca, K. and Trystram, D. (2006). Brief announcement: Promoting cooperation in selfish grids. In *SPAA 2006 (Annual ACM Symposium on Parallelism in Algorithms & Architectures) Proceedings*, page 332. ACM Press. Conference version of [Rzadca and Trystram, 2009]

Wojtyla, G., Rzadca, K., and Seredynski, F. (2006). Artificial immune systems applied to multiprocessor scheduling. In *PPAM 2005 Proceedings*, volume 3911 of *LNCS*, pages 904–911. Springer

Rzadca, K. (2006). Evaluating the quality of maximum variance cluster algorithms. In *ICCVG 2004 (International Conference on Computer Vision and Graphics) Proceedings*, volume 32 of *Computational Imaging and Vision*, pages 981–986. Springer

Rzadca, K. and Seredynski, F. (2005). Heterogeneous multiprocessor scheduling with differential evolution. In *IEEE CEC 2005 (Congress of Evolutionary Computation) Proceedings*, pages 2840–2847. IEEE Computer Society

Rzadca, K. and Ferri, F. (2003). Incrementally assessing cluster tendencies with a maximum variance cluster algorithm. In *IbPRIA (Iberian Conference on Pattern Recognition and Image Analysis) Proceedings*, volume 2653 of *LNCS*, pages 868–875. Springer