

# CS&P 2019: An account

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1. CS&P 2019 was held in September 24-27 on the premises of University of Warmia and Mazury in Olsztyn, premises familiar to many members of Rough Set Society who took part in the IJCRS 2017 conference held there. CS&P is the series of workshops initiated by Professors Helena Rasiowa (Warsaw University) and Helmut Thiele (Humboldt University) which are held alternately in Germany and Poland once a year in the end of September. This year's conference was 28th in a row. The acronym CSP stands for Concurrency, Specification, Programming which reflected main topics of research in the first years from establishing the CS&P workshops, but, gradually, the scope of the workshops have been extended, admitting new topics, in particular rough set theory.

It is well visible from the listing of talks presented in the current workshop which includes: M. Azad et al. on 'Decision Trees for Knowledge Representation'; V. Preoteasa et al. on 'Modelling Programmable Logic Controllers in Refinement Calculus of Reactive Systems'; A. Skowron et al. on 'Data Science Computing Model: Interactive Granular Computing (IGrC)'; A. Reißner and Matthias Werner on 'A New Definition of Composition of LTIHA'; Z. Suraj et al. on 'Optimized Fuzzy Petri Nets and Their Application for Transport Logistics Problem'; D. Gruska and M. C. Ruiz on 'Observations, Testing and Security'; D. Gruska and A. Ali on 'Attack Protection Tree'; L. Czaja on 'Computing with Natural Numbers in Cause-Effect Structures'; L. Polkowski On 'Logical and mereological renderings of the Bayes theorem'; K. Pancierz and J. Sarzyński on 'A Fuzzy Set Tool in the Classification and Prediction Software System (CLAPSS)'; A. and A. Zbrzezny on 'Checking MTL Properties of Timed Automata with Dense Time using Satisfiability Modulo Theories'; Ł. Żmudziński on 'Rough Mereology based CFill algorithm for robotic path planning'; A. Grabowski on 'RIFs as the Formal Tool of Measuring Similarity between Sets'; P. Czaus on 'Unsupervised Graphical User Interface Learning'; K. Ropiak on 'Rules from granules vs. granulated rules'; P. Artiemjew and P. Idzikowski on 'Building an Ensemble of Naive Bayes Classifiers ...'; Hung Son Nguyen on 'Rough Set Model Semantic Text Analysis'; P. Drozda et al. on 'Emplobot – Design of the System'; T. Krzywicki 'Application of meta-learning methods in the recognition of drums and cymbals on the basis of short sound samples'.

The author wants to single out three submissions in his subjective opinion most interesting for him, viz., those by Ludwik Czaja, Andrzej Skowron, Soma

Dutta and Andrzej Jankowski, and, Lech Polkowski (sorry for partizanship) as works which offer some new angles on existing state of knowledge.

Czaja's work constructs a Petri net operating with natural numbers as tokens; let us quote from abstract: 'Implementation of the standard model of natural numbers arithmetic is constructed in terms of c-e structures. The numbers are represented by sets of (unstructured) tokens at nodes of the structures ... . Such modelling of arithmetic operations is possible due to the inhibiting capability in the c-e structures. The exact cost of the typical operations modelled by c-e structures constructed in this paper, is computed.'

Let us quote from Skowron's et al. abstract: Rough sets, introduced by Zdzisław Pawlak [1], play a crucial role in the development of Granular Computing(GrC)[2-4].The extension of GrC to Interactive Granular Computing (IGrC) (initiated by Skowron and co-workers [5-7]4), requires generalization of the basic concepts of rough sets and GrC such as granules to complex granules (including both physical and abstract parts), information (decision) systems to interactive information (decision) systems as well as methods of inducing hierarchical structures of information (decision) systems to methods of inducing hierarchical structures of interactive information (decision) systems. IGrC takes into account the granularity of information as used by humans in problem solving, as well as interactions with (and within) the real physical world. The computations in this IGrC model are realized on the interactive complex granules and that must be based on the consequences of the interactions occurring in the physical world.'

Finally, from Polkowski's abstract: ' The Bayes theorem published posthumously as the work of Rev. Thomas Bayes (1701/2-1761) in 'Essay Towards Solving a Problem in the Doctrine of Chances' (1764) rediscovered by Lagrange, provides a foundation for some areas of AI like Bayesian Reasoning, Bayesian Filtering etc. It had been reformulated in logical terms by Jan L ukasiewicz (1913). Recently, an abstract version couched in mereological terms was formulated and a strengthening of it appeared derived from the Stone representation theorem for complete Boolean algebras. It is our aim to comprehensively present those approaches.'

The more detailed information about CS&P 2019 can be found on its web page [csp2019.uwm.edu.pl](http://csp2019.uwm.edu.pl). Papers from CS&P 2019 will soon appear in CEUR-WS.org portal.

We mentioned that CSP series of workshops was initiated on the Polish side by Professor Helena Rasiowa. This year marks the 25th anniversary of Professor Rasiowa's departure from the earthly path and CS&P 2019 organizers decided to dedicate the workshop to Her memory. The special session dedicated to Her memory took place on Wednesday, September 25. During the session we listened to recollections by some students and collaborators of Professor Rasiowa: Andrzej Skowron, Andrzej Jankowski and to short recollections by Professors Janusz Czelakowski and Lech Polkowski. We also read recollections sent by Professor Victor Marek, Professor Maria Semeniuk-Polkowska, Dr Eleonora Perkowska and Professor Tadeusz Mostowski. All recolections are available on the conference web page: [csp2019.uwm.edu.pl/Remembering Professor Helena](http://csp2019.uwm.edu.pl/Remembering%20Professor%20Helena)

Rasiowa.

An additional event augmenting that aspect of the workshop was a painting exhibition dedicated to the memory of Professor Helena Rasiowa opened on Tuesday, September 24, at the Ecumenical Center of Olsztyn Bishopric, paintings authored by Maria Semeniuk-Polkowska. The opening was frequented by many participants of CS&P 2019.

There is hope that CS&P series will gain in attendance and importance in the future due to its long tradition and practice of publishing selected submissions in *Fundamenta Informaticae*. Let us encourage rough set researchers to take part in CS&P next editions. The 2020 edition will take part in Berlin, in the Einstein Center Digital Future, Wilhelmstraße 67, Berlin, from 28 to 30 September 2020, organized by Professor Holger Schlingloff from Humboldt University.