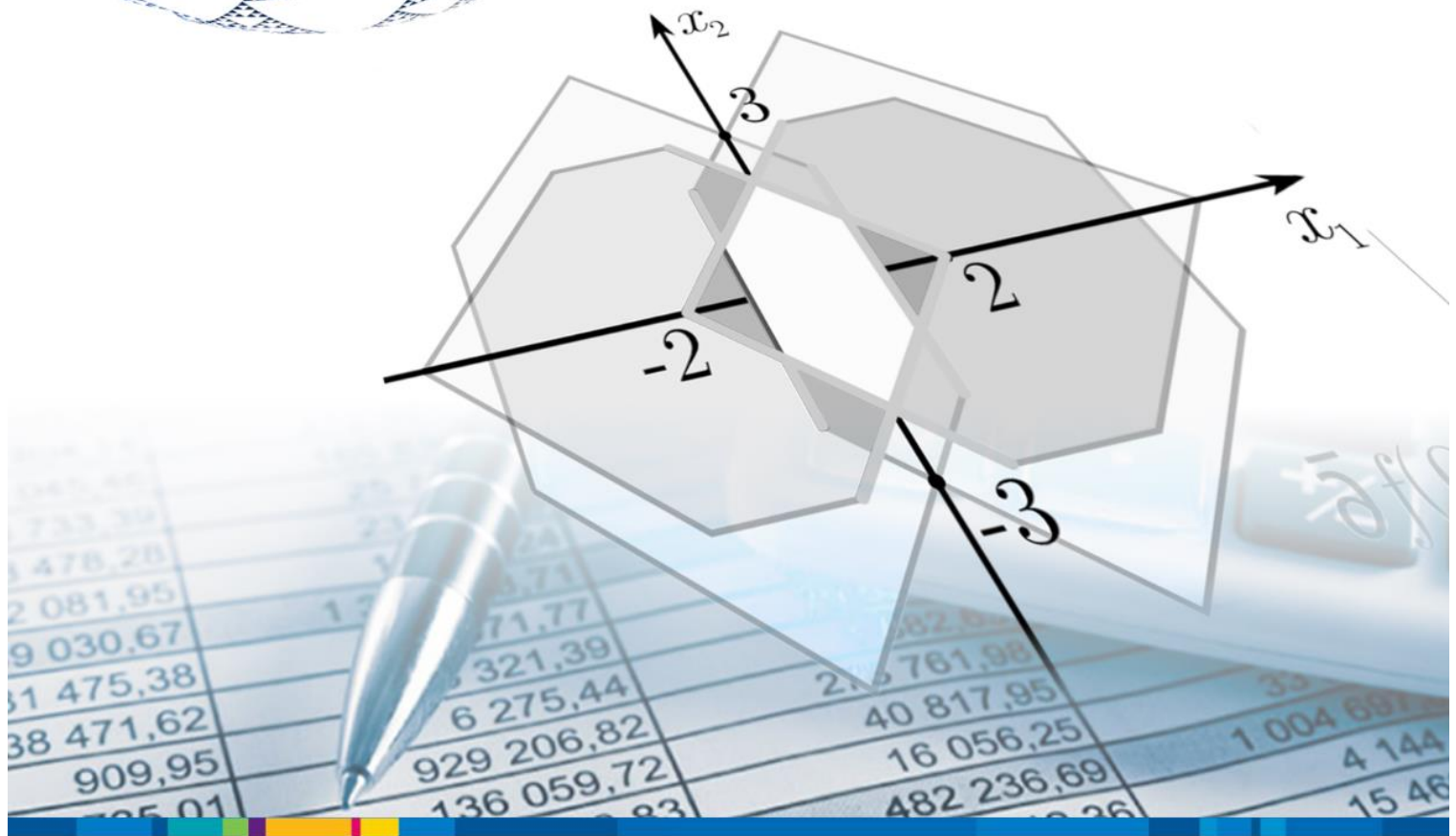


CIAO Newsletter

Centre for Informatics and
Applied Optimization

Edition #39: Jan-Mar 2019



Director's section

Welcome to our first Newsletter of 2019. It covers the period January-March.

First of all, let me use this opportunity to congratulate all CIAO and School researchers for the fantastic ERA 2018 results. For the first time, our research in applied mathematics has been recognised by the ARC as being "well above world standard". This is indeed a significant achievement, and our mathematicians feel very proud of it. Of course, this implies that the School and the University should also be proud of having good mathematicians working here.

Let me also remind everybody that CIAO is not formed only by mathematicians. IT researchers have also contributed strongly to FedUni research, with Artificial Intelligence and Image Processing having been recognised as being "above world standard". Congratulations to CIAO IT people and our colleagues and friends from the Centre for Multimedia Computing, Communications, and Artificial Intelligence Research (MCCAIR). Congratulations to CIAO researchers contributing to other fields of research earning good marks in the 2018 ERA round and to all CIAO friends and supporters within and outside the university.

There has been no response from the University yet to our application for the renewal of the CIAO status as a University Research Centre. To my knowledge, the decision is expected around July. Hopefully CIAO research being highly recognised nationally and internationally will get some recognition also within the university.

It seems the beginning of 2019 was very successful for A/Prof Madhu Chetty who travelled to India to visit several locations and attend several important meetings. On this trip, in particular, he became Honorary Professor of Amity University (Rajasthan), Jaipur, India. The award was conferred in recognition of Madhu's expertise in computational intelligence, data analytics and their applications. On behalf of all CIAO members, I congratulate Madhu on this wonderful achievement.

Apart from that, these three months were business as usual. Please enjoy the 'CIAO in history' section. Twenty years ago our founder Alex Rubinov became professor of this university, and ten years ago we had the inaugural public Alex Rubinov Memorial Lecture delivered by his colleague who first introduced and welcomed Alex to the then University of Ballarat, Professor Barney Glover. The lectures have become annual popular events on CIAO, School and University calendars. The 2019 lecturer has already been identified, and the date fixed. The details are going to be disclosed soon.

All available previous issues starting from 2003 as well as the series of the *School of Information Technology & Mathematical Sciences* Research Newsletters dating from 1998 can be accessed from the CIAO web site: <http://federation.edu.au/ciao>.

A. Kruger

Prof Alex Kruger

In this issue:

- Grants, awards and recognition
- Past and forthcoming events
- CIAO seminars
- CIAO visitors
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- Announcements
- CIAO in history
- New publications



Prof Alex Rubinov
CIAO Founding
Director



Prof Alex Kruger
CIAO Research
Director



Dr Guillermo Pineda
Editor of CIAO
Newsletter

Grants, awards and recognition

ERA 2018: Five-out-of-five for world class research

The quality of research at Federation University has achieved the highest possible five-out-of-five rating (above world standard) in seven research areas under the 2018 Excellence in Research Australia (ERA) results. A further nine research areas were ranked at world standard.

Hundreds of research outputs were assessed as part of the ERA framework. This includes:

01	Mathematical Sciences	3
0101	Pure Mathematics	3
0102	Applied Mathematics	5
08	Information and Computing Sciences	3
0801	Artificial Intelligence and Image Processing	4

A quote attributable to Vice-Chancellor and President, Professor Helen Bartlett:

"From never having achieved a five-star rating to achieving seven – these outstanding results reflect our focus on producing world-leading research that has a real impact on people's lives."

A quote attributable to Deputy Vice-Chancellor of Research and Innovation, Professor Chris Hutchison:

"This is a fantastic result for a regional university – we're producing world-class research in our local communities that can be applied to people living anywhere in the world."

Engagement and Impact 2018 outcomes

FedUni impact in 01 Mathematical Sciences has been evaluated by the ARC as "Medium", while its approach to impact has been marked as "High".

CIAO researcher awarded honorary professorship from Amity University Rajasthan

A/Prof Madhu Chetty was recently awarded an Honorary Professorship from Amity University (Rajasthan), Jaipur, India. The conferment on an individual of the title "Honorary Professorship" of the Amity University is a distinguished honour given to a person of eminence, other than the University Faculty, who would have had a long association with the University and have made outstanding contributions in his/her professional career.

The award was conferred in recognition of Madhu's expertise in computational intelligence, data analytics and their applications.

Madhu joined six other individuals recognised for their contributions including Lord Jeffery Archer, UK who has been number one author many times, Dr Vijay Bhatkar – India's number one in supercomputing and Dr S Mande, Director General of National Laboratories and two others.

The Amity Group of Educational Institutions has established nine universities in India and a number of Higher Educational Institutions and Schools and several campuses in India and abroad in London, California, New York, Singapore, Dubai, Mauritius, China, Romania and Sth Africa with 1,500,000 students across the group.

The Award was presented at the Convocation Ceremony on 25 January 2019 at Amity University (Rajasthan) Jaipur, India by Professor Arun Patil, Vice Chancellor/President of Amityh University Rajasthan.



A/Prof Madhu Chetty In procession in company of the Vice Chancellor of Amity Jaipur, Prof Patil

Events

FedUni part of global discussions on emerging trends in AI in academia and industry

On 19th January 2019, Jawaharlal Nehru University (JNU), New Delhi, India organised a brainstorming session (AI trends in academia and industry) to discuss and assess the emerging trends and future of Artificial Intelligence from the academic and industry perspective. It was chaired by Vice Chancellor Professor Jagadesh Kumar, Hon'ble Vice Chancellor, JNU, New Delhi. A/Prof Madhu Chetty was on the panel representing Federation University Australia.



A/Prof Chetty (far left) along with other panel members

A/Prof Chetty said, “AI will continue to have significant impact on almost all walks of life. Considering its impact, it would perhaps be appropriate to consider including teaching of AI and Data Science courses in various degree programs.”

Amity International Conference on Artificial Intelligence (AICAI 2019)

A/Prof Madhu Chetty gave an invited talk at Amity University Dubai Conference on 4 February 2019. The title of the talk was “Evolutionary Optimisation for reconstructing gene regulatory network”. More than 200 delegates from various parts of the globe participated with authors of accepted papers from 14 countries attending. The conference was technically sponsored by IEEE UAE Section.



A/Prof Madhu Chetty, FedUni 4th from right, Dr Narayanan Ramachandran, pro Vice Chancellor, Amity University Dubai Campus, 2nd from left, Dr SR Subramanya Session Chair, and Dr Ajay Rana Conference Co-Chair 3rd from right. Others: Conference Organisers.

CSIRO/Data 61 meeting

A meeting was held 16 January 2019 with Dr Serryn Eagleson, University Partnerships Manager to discuss potential opportunities with FedUni. Areas discussed were PhD Scholarships, Research Projects and Funding Opportunities and increasing accessibility of both FedUni and CSIRO/Data 61 staff for research collaboration.

It is important that all researchers make sure they have a profile on the Expert Connect website so please check and make sure you are listed <https://expertconnect.global/>. CSIRO/Data61 and industry use this to find researchers.

Forthcoming events

CIAO Showcase

CIAO is holding its showcase on Tuesday 9th of April 2019. The program is below. The showcase presents a good opportunity to learn of the great research that CIAO is carrying out. We look forward to meeting the new DVC R & I Chris Hutchison who is opening the Showcase. The Showcase will be followed by a forum on Lessons from ERA and Impact and Engagement which will help attendees to understand the process and some of the facts and stats.

The 2019 International Workshop on Safety, Security, and Trust in Intelligent Transportation System (SST-ITS)

This workshop will be held at the Novotel Rotorua Lakeside, New Zealand on 5-8 August 2019. It focuses on solutions that leverage techniques and insights from the domains of cyber security, artificial intelligence, edge computing, big data, and transportation engineering to resolve privacy, security, and trust challenges in Intelligent Transportation Systems.

The program chairs are:

- Krishna Kant, Temple University, USA
- **Joarder Kamruzzaman, Federation University Australia**
- **Alireza Jolfaei, Federation University Australia**

For more information visit <http://jolfaei.info/SSTITS2019.html>

Security, Reliability, Privacy, and Quality in Industrial Automation and Control, a special issue at IEEE Transactions on Industry Applications.

Guest Associate Editors:

- Dr. Muhammad Usman, University of Surrey, United Kingdom (muhammad.usman3@griffithuni.edu.au)
- **Dr. Alireza Jolfaei**, Federation University, Australia (a.jolfaei@federation.edu.au)
- **Professor Iqbal Gondal**, Federation University, Australia (iqbal.gondal@federation.edu.au)
- Professor Krishna Kant, Temple University, USA (kkant@temple.edu)
- A/Professor Anurag Srivastava, Washington State University, Pullman, USA (asrivast@eecs.wsu.edu)
- Professor Sukumar Kamalasadana, University of North Carolina, Charlotte, USA (skamalas@uncc.edu)

The aim of this special issue is to provide a multi-aspect up-to-date reference of security, quality, monitoring, reliability, privacy, trust, and control aspects of industrial applications. Prospective researchers are invited to submit original and innovative techniques-based research papers and survey papers for consideration for publication in this special issue.

Prospective authors are advised to first submit an abstract to the Guest Editors listed above. Authors of the accepted abstracts will receive a formal invitation with detailed guidelines for submission of the complete manuscript to the IAS ScholarOne Manuscripts site and execution of the mandatory copyright transfer. All submissions will go through CrossCheck for similarity check with previously published content. Refer to <https://ias.ieee.org/images/files/publications/2017-author-info.pdf> for general information about electronic submission. After receiving the invitation, the invited authors must go to the IAS ScholarOne Manuscripts site (<https://mc.manuscriptcentral.com/ieee-ias>) to upload and submit the manuscript, and execute the IEEE copyright transfer.

Timeline:

- Manuscript Submission and Copyright Transfer Due: August 10, 2019
- Deadline for Final Decision: February 8, 2020
- Final Manuscript Submission: March 7, 2020
- Publication of Special Issue: July/August 2020

For more information, visit www.linkedin.com/pulse/ieee-transactions-industry-applications-special-issue-alireza-jolfaei-1c/

WoMBaT 2019

The fourth Workshop on Metric Bounds and Transversality (WoMBaT2019) will be held on 8–10 December 2019 at Swinburne University of Technology in Melbourne. Registration is free.

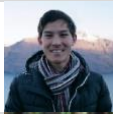


Confirmed international participants

- Prof Alexander Ioffe (Technion)
- Prof Marco López (University of Alicante and Federation University Australia)
- Prof Michel Théra (University of Limoges and Federation University Australia)
- Dr Nir Sharon (Tel Aviv University)

For the details and registration visit <https://www.wombat.rmitopt.org/>.

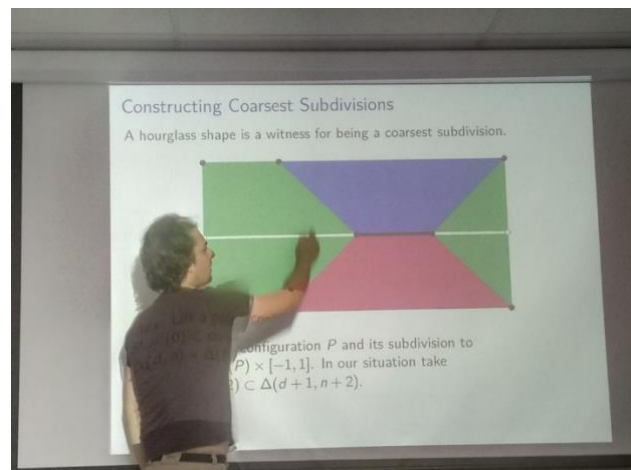
CIAO seminars

Optimisation

Date	Name	Affiliation	Topic	
28 Mar	Dr Matthew Tam	University of Göttingen, Germany	From the discrete to the continuous and back again	
21 Mar	Ms Hoa Thi Bui	CIAO, FedUni	On Fréchet subdifferential calculus with applications to non-smooth and non-convex optimization	
11 Jan	Dr Benjamin Schroeter	Binghamton University, USA	Rays of the secondary fan of a matroid polytope	



Dr Benjamin Schroeter, 11 Jan 2019



Dr Benjamin Schroeter, 11 Jan 2019



Ms Hoa Bui, 21 Mar 2019



Ms Hoa Bui, 21 Mar 2019

Information technology

Date	Name	Affiliation	Topic
8 Mar	Dr Taiwo Oseni	CIAO, FedUni	WE2ST – International Women’s Day Seminar
13 Feb	Iqbal Gondal	ICSL, CIAO, FedUni	MRE Taster Event, Melbourne



Dr Taiwo Oseni’s seminar, 8 Mar 2019



Dr Taiwo Oseni’s seminar, 8 Mar 2019

CIAO Visitors

Dates	Name	Institution
18–31 Mar	Dr Napsu Karmitsa	Department of Mathematics & Statistics, University of Turku, Finland

5–19 Mar	Prof Ramiz Aliguliyev	Institute of Information Technology, Azerbaijan & National Academy of Sciences, Azerbaijan
20 Feb – 17 Mar	Prof Fusheng Bai	Chongqing Normal University, China
27 Jan – 20 Feb	Prof Zhiyou Wu	Chongqing Normal University, China
7 Jan – 2 Feb	Prof Zhaohao Sun	PNG University of Technology
4–17 Jan	Dr Benjamin Schroeter	Binghamton University, USA

HDR News

New PhD scholarships at the School of Science, Engineering and Information Technology

The university has approved 12 international PhD scholarships (including fee waivers and stipends) for our school. We are in the process of advertising these.

Information on the available projects can be found at <https://federation.edu.au/schools/school-of-science-engineering-and-information-technology/research/phd-scholarship-projects>.

Prospective PhD students are encouraged to contact relevant supervisors and apply for PhD study with us. Details of how to apply can be found at <https://federation.edu.au/research/study-with-us/apply>

PhD Student Confirmations

Congratulations to Cuong Duy Nguyen (15 January) and Charlotte Young (28 March) on their confirmation of candidature which they successfully passed.

New Students

We have a number of new PhD and Masters Students commencing including Shipra Chinna, Nadia Faisal, supervised by Mehmood Chadhar and Ahmad Hararesh supervised by Andrew Barton.

Announcements

University Research Centres and Research Groups

CIAO submitted an application for the renewal of its status as a university research centre on 30 November 2018. Notification on the outcome is expected later in the year.

Academic Promotions Policy and Processes Review

Federation University has started a formal review of its Academic Promotions policy and processes for levels C, D and E.

As a result, the academic level C, D and E call out date has been postponed to July 2019 with promotion panels meeting in November/December. If a staff member is intending to apply for academic promotion this year, he/she is encouraged to collect the relevant information but to

refrain from completing the application template at this stage. There may be potential changes to this process.

CIAO in history

20 year ago (Research Newsletter #8, April 1999)

Appointment

In recognition of his work and standing in the School and University **Alex Rubinov** has been appointed "Professor". Alex in his time at the University has been prolific in his publications and very successful with large research grants. He has been very active in bringing visitors of high academic standing to the University and contributing to the academic and research life of this school. All staff in the School congratulate Alex on this well-earned appointment.

15 year ago (CIAO Newsletter #5, February 2004)

VIC2004

Professor Alex Rubinov, Dr Alex Kruger, Zari Dzalilov, Dr David Yost and Professor Sid Morris participated in the VIC2004, a joint mathematics conference between the New Zealanders and the Israel Mathematical Union. Game Theory, Optimization and Functional Analysis featured at the conference. Impressive plenary talks were given by Hugh Woodin and Fields medallist Vaughan Jones. Dr David Yost, Dr Alex Kruger, Professor Sid Morris and Professor Alex Rubinov gave talks. The presence of UB was felt.

10 year ago (GSITMS Graduates of Distinction, vol. 3, no. 1, Summer 2009)

Alex Rubinov honoured through Annual Memorial Lecture

"Alex was a man of remarkable character, high intellectual ability and great dedication" (Deputy Vice-Chancellor **Professor Wayne Robinson**)

The inaugural public lecture to honour the memory of the Founding Director of CIAO, the late **Alex Rubinov** was appropriately delivered in fine style by the colleague who first introduced and welcomed Alex to UB, **Professor Barney Glover**, Vice-Chancellor of Charles Darwin University, NT. Professor Glover recalls that he had to intervene with the Australian Authorities in 1996 to allow Alex to board a plane from his (then) home in Israel to travel to UB in Australia explaining that "...you do not have to be a fluent English speaker to undertake mathematical research"!

Under Alex's leadership CIAO became a research institute of international repute. CIAO is recognised for its theoretical and practical research of sophisticated mathematical and IT solutions to a broad range of industry problems.

Professor Glover's lecture entitled "*Finding the best solution: Innovation, Education and Mathematics*" skilfully drew on his intimate knowledge of Alex, administrative challenges for regional Universities, with just a touch of national University 'politics' thrown in. Professor Glover foresaw the development of more widely based academic collaborations (mission based 'compacts' with multi-disciplinary mathematics teaching) which would demand significant curriculum reform in the teaching of mathematics.

The establishment of the GSITMS

A fine (and first) Graduate School for UB

"UB is delighted that the proposal for a Graduate School of Information Technology and Mathematical Sciences has received the approval of the Academic Board and the University Council," said **Professor David Battersby**, Vice-Chancellor. This is the first Graduate School of its type in Australia, operational from January 5, and will position the University well in terms of attracting postgraduate research students, international scholars, and industry partners for a range of research projects."

"**Professor Sid Morris**, the Head of the Graduate School, and his staff are to be congratulated for pioneering this initiative and for ensuring that the new School will continue to be at the vanguard of best practice in learning, teaching and research."

10 year ago (CIAO Newsletter #23, Autumn 2009)

Stronger ties with China

CIAO Director Professor John Yearwood has recently returned from a two-week visit to China, with Dr Fusheng Bai, Dr Adil Bagirov and Dr Musa Mammadov. The purpose of the trip was to strengthen existing links and establish new ones.

Chongqing: The first week of the trip was funded by Chongqing Normal University (CNU), under a Chinese Government scheme for supporting research collaboration.

Beijing: In Beijing, discussions took place with Associate Professor Liu from the Research Centre for Future Internet Technology, Tsinghua University. In particular, there are potential areas for collaboration with CIAO's Internet Commerce Security Laboratory (ICSL), in areas such as the security vulnerabilities of Internet Protocol Version 6.

Harbin: At Harbin Engineering University (HEU) Professor Yearwood and Dr Mammadov Musa made presentations to the staff & about 40 Masters students. Later there was a very successful formal meeting with the Vice-President of HEU and the Vice-Dean of their Foreign Affairs Department, and they are keen to strengthen their collaboration with CIAO.

Shanghai: There was a formal signing of the renewal of the China-Australia Collaboration in Applied Optimization (CACAO) Memorandum of Understanding with Shanghai University. During these meetings CIAO also agreed to host the next China-Australia Workshop in Ballarat, scheduled for December 2009.

Barcelona Visitor

Professor Martinez-Legaz visited CIAO for several weeks in January-February 2009 to undertake research collaboration with Dr Adil Bagirov. He is a Professor of Economics at the Universitat Autònoma de Barcelona, Spain, and an expert in the areas of optimization, nonlinear analysis and their applications in economics. Professor Martinez-Legaz is Editor-in-Chief of the journal Optimization, and an Editorial Board Member of several other international journals. He also co-wrote a number of research papers with the late Professor Alex Rubinov, Founding Director of CIAO. This was his sixth visit to UB.

Dr Peter Vamplew and Dr Richard Dazeley attended and presented research papers at the 21st Australasian Joint Conference on Artificial Intelligence in Auckland, New Zealand, in December 2008.

Dr Andrew Stranieri and Ms Armita Zarnegar attended and presented research papers at the Australasian Computer Science Week in Wellington, New Zealand in January 2009.

PhD Thesis Submission

Mr Guillermo Pineda-Villavicencio. PhD Topic: Improving upper & lower bounds on the order of large graphs under degree & distance constraints. Supervisors: Professor John Yearwood and Professor Mirka Miller.

Publications: January-March 2019 (SCOPUS)

1. [Bagirov A.](#), [Taheri S.](#), [Asadi S.](#) *A difference of convex optimization algorithm for piecewise linear regression.* (2019), Journal of Industrial and Management Optimization, vol. 15, pp. 909-932, 10.3934/jimo.2018077.
2. [Bagirov A.M.](#), [Ozturk G.](#), [Kasimbeyli R.](#) *A sharp augmented Lagrangian-based method in constrained non-convex optimization.* (2019), Optimization Methods and Software, vol. 34, pp. 462-488, 10.1080/10556788.2018.1496431.
3. [Burke W.](#), [Oseni T.](#), [Jolfaei A.](#), [Gondal I.](#) *Cybersecurity Indexes for eHealth.* (2019), ACM International Conference Proceeding Series, 10.1145/3290688.3290721.
4. [Cibulka R.](#), [Fabian M.](#), [Kruger A.Y.](#) *On semiregularity of mappings.* (2019), Journal of Mathematical Analysis and Applications, vol. 473, pp. 811-836, 10.1016/j.jmaa.2018.12.071.
5. [Doolittle J.](#), [Nevo E.](#), [Pineda-Villavicencio G.](#), [Ugon J.](#), [Yost D.](#) *On the Reconstruction of Polytopes.* (2019), Discrete and Computational Geometry, vol. 61, pp. 285-302, 10.1007/s00454-018-9997-9.
6. [Gabrielyan S.S.](#), [Morris S.A.](#) *A topological group observation on the Banach–Mazur separable quotient problem.* (2019), Topology and its Applications, 10.1016/j.topol.2019.02.036.
7. [Geschke A.](#), [Ugon J.](#), [Lenzen M.](#), [Kanemoto K.](#), [Moran D.D.](#) *Balancing and reconciling large multi-regional input–output databases using parallel optimisation and high-performance computing.* (2019), Journal of Economic Structures, vol. 8, 10.1186/s40008-019-0133-7.
8. [Kulkarni P.](#), [Stranieri A.](#), [Jeline H.](#) *Comparing Pixel N-grams and Bag of Visual Word Features for the Classification of Diabetic Retinopathy.* (2019), ACM International Conference Proceeding Series, 10.1145/3290688.3290726.
9. [Maluta E.](#), [Yost D.](#) *Thin sets of constant width.* (2019), Journal of Mathematical Analysis and Applications, vol. 469, pp. 1080-1087, 10.1016/j.jmaa.2018.09.053.
10. [Pineda-Villavicencio G.](#), [Ugon J.](#), [Yost D.](#) *Lower bound theorems for general polytopes.* (2019), European Journal of Combinatorics, vol. 79, pp. 27-45, 10.1016/j.ejc.2018.12.003.
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12. [Ul Haq I.](#), [Gondal I.](#), [Vamplew P.](#), [Brown S.](#) *Categorical features transformation with compact one-hot encoder for fraud detection in distributed environment.* (2019), Communications in Computer and Information Science, vol. 996, pp. 69-80, 10.1007/978-981-13-6661-1_6.
13. [Zarnegar A.](#), [Jelinek H.F.](#), [Vamplew P.](#), [Stranieri A.](#) *Integrating Biological Heuristics and Gene Expression Data for Gene Regulatory Network Inference.* (2019), ACM International Conference Proceeding Series, 10.1145/3290688.3290741.