

## CV of Prof. Konstantin KONSTANTINOV

### **Education:**

PhD in Chemistry, 1991, **University of Chemical Technology and Metallurgy**, Sofia, Bulgaria  
MSc (Chemist Engineer), 1984, **University of Chemical Technology and Metallurgy**, Sofia, Bulgaria

### **Employment History:**

**CURRENT APPOINTMENT: Professor, Level E, AIIM/ISEM, University of Wollongong**

2017-202: Associate Professor, Engineering Faculty, (ISEM), University of Wollongong

2012-2016: Senior Lecturer, Engineering Faculty, (ISEM), University of Wollongong

2007-1012: Lecturer, Engineering Faculty, (ISEM), University of Wollongong

2000-2006: Research Fellow, Institute for Superconducting & Electronic Materials (ISEM), University of Wollongong

1991-2000: Associate Researcher, Bulgarian Acad. Sciences, Inst. of General & Inorganic Chemistry, Sofia, Bulgaria

1987-1990: PhD student, University of Chemical Technology and Metallurgy, Dept. of Semiconductors, Sofia, Bulgaria

1985-1987: Chemist Engineer, Electronic Components Plant (ZEPE), Sofia – Bulgaria

### **Obtained fellowships and scholarships**

1. CNRS, CECM (Centre National de la Recherche Scientifique – Centre D'Etude de Chimie Metallurgique), Paris, France, 1992/1993, post-doctoral position, study on synthesis of 110 K High Temperature Superconducting (HTSC) materials via metallurgical route.

2. VITO/MOL (Vlaamse Instelling voor Technologisch Onderzoek), Mol, Belgium, 1993/1994, postdoctoral position, study on HTSC Y-Ba-Cu-O and Bi-Pb-Sr-Ca-Cu-O materials.

### **Professorial Scholarships**

- 2009: 3 months Invited Professor Position at University of Orleans, France.
- 2008: 3 months Invited Professor Position at University of Orleans, France.
- 2013: 1 month Invited Visiting Professor at Hannover University, Germany

### **Awards**

2020 UoW, VC Award for Excellence in Interdisciplinary Research

### **Research Scholarship Impact**

**Summary of publications: Total number of peer reviewed publications: 222, total number of citations 9531. h-index 52. Google Scholar Public URL:**

**[https://scholar.google.com.au/citations?hl=en&user=BLcluBUAAAJ&view\\_op=list\\_works](https://scholar.google.com.au/citations?hl=en&user=BLcluBUAAAJ&view_op=list_works)**

- Assessor of ARC DP, LP, FF and DECRA proposals.

- Assessor of NHMRC proposals.

### **Initiation of new research directions at ISEM/AIIM, which have attracted external and internal funding**

- Design and synthesis of nanoceramic composites for energy storage using original scalable nanotechnologies These methods are able to support large scale fabrication of materials with unique architectures such as globular graphene composites, in-situ S-Carbon composites, and ternary isotropic composite materials for top performance energy storage applications. These achievements were described in the most respected journals such as Energy & Environmental Science and Angewandte International Edition. Due to the research outcomes of my original synthesis methods and materials concepts I have been awarded one ARC DP and I have published 38 papers in this research area. I have also designed the spray pyrolysis synthesis facilities at ISEM and the materials obtained with these facilities were the backbone of other successful ISEM articles for Li-ion batteries and of ARC projects in this field.

- Nanoceramis materials for health protection I have successfully created collaborative teams between ISEM, CMRP and MMM, with whom we developed a number of very promising materials for cancer therapies. The results were highly evaluated and our team won an NHMRC project to develop theranostic systems based on such materials for radiation cancer treatment.

- Design and development of next generation multifunctional sunscreen products optimized for Australian conditions. Our multidisciplinary team under my principal supervision was awarded three times UoW GC projects for development of UV protective materials and concepts for the Australian population

### **Mentoring HDR Students**

I have supervised **14** Postgraduate students as principal supervisor (12 completions) and **22** Postgraduate students as co-supervisor (**12** completions). Two of my students have received UPA support and another six international students received IPTA support as recondition of their performance.

I have also supervised or co-supervised **18** UoW honours students, providing successful early engagement and student transition for **5** students to enrol in PhD programs at AIIM and three of them were granted UPA.

### **Some selected articles:**

1. Nai-Sheng Hsu, Moeava Tehei, Md Shahriar Hossain, Anatoly Rosenfeld, Muhammad JA Shiddiky, Ronald Sluyter, Shi Xue Dou, Yusuke Yamauchi, Konstantin Konstantinov, Oxi-Redox Selective Breast Cancer Treatment: An In Vitro Study of Theranostic In-Based Oxide Nanoparticles for Controlled Generation or Prevention of Oxidative Stress, ACS Applied Materials & Interfaces, **13** (2021) 2204.
2. Yajie Liu, Zhixin Tai, Jian Zhang, Wei Kong Pang, Qing Zhang, Haifeng Feng, Konstantin Konstantinov, Zaiping Guo, Hua Kun Liu, Boosting potassium-ion batteries by few-layered composite anodes prepared via solution-triggered one-step shear exfoliation, Nature Commun. **9** (2018) 3645.
3. Yajie Liu, Zhixin Tai, Qing Zhang, Hongqiang Wang, Wei Kong Pang, Hua Kun Liu, Konstantin Konstantinov, Zaiping Guo, A new energy storage system: Rechargeable potassium-selenium battery, Nano Energy **35** (2017) 36.
4. Chao Li, Md Monirul Islam, Julian Moore, Joseph Sleppy, Caleb Morrison, Konstantin Konstantinov, Shi Xue Dou, Chait Renduchintala, Jayan Thomas, Wearable energy-smart ribbons for synchronous energy harvest and storage, Nature Commun. **7** (2016) 13319.
5. Md. M. Islam, S. H. Aboutalebi, D. Cardillo, H. K. Liu, K. Konstantinov, and S. X. Dou, Self-Assembled Multifunctional Hybrids: Toward Developing High-Performance Graphene-Based Architectures for Energy Storage Devices, ACS Central Science **1** (2015)206.
6. A. Chidembo, S. Aboutalebi, K. Konstantinov, M. Salari, B. Winton, S. Yamini, I. Nevirkovets and H. K. Liu, Globular reduced graphene oxide-metal oxide structures for energy storage applications, Energy & Environmental Science **5** (2012) 5236.
7. S.-H. Aboutalebi, A. T. Chidembo, M. Salaty, K. Konstantinov, D. Wexler, H.-K. Liu, and S. X. Dou, Comparison of GO, GO/MWCNTs composite and MWCNTs as potential electrode materials for supercapacitors, Energy & Environmental Science **4** (2011) 1855
8. M. Salari, K. Konstantinov, and H.K. Liu, Enhancement of the capacitance in TiO(2) nanotubes through controlled introduction of oxygen vacancies, J. Mater. Chem. **21** (2011) 5128.
9. Shu-Lei Chou, Jia-Zhao Wang, David Wexler, Konstantin Konstantinov, Chao Zhong, Hua-Kun Liu, Shi-Xue Dou, High-surface-area  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>/carbon nanocomposite: one-step synthesis and its highly reversible and enhanced high-rate lithium storage properties, J. Materials Chemistry **20** (2010) 2092.
10. See-How Ng, J. Wang, D. Wexler, K. Konstantinov, Z. P. Gou, H. K. Liu, Highly reversible Lithium Storage in spheroidal Carbon-coated Silicon nanocomposites as anodes for LI-ion batteries, Angew. Chem. Int. **45** (2006) 6896.

### **Major competitive grants funding – 20 ARC and NHMRC projects in total for the last 20 years. List of competitive grants for the last five years:**

1. 2018-2020 ARC DP Potassium ion batteries for large scale renewable energy storage \$494k
2. 2018-2020 ARC DP Development of ambient air operation rechargeable sodium-air batteries \$372

3. 2017-2019 ARC LP Development of novel safe lithium metal-free sulphur batteries \$210k
4. 2016-2018 ARC LP Development of Novel Safe Lithium Metal-Free Sulfur Batteries \$210k
5. 2015-2017 NHMRC Design and application of new nanomaterials theranostic platforms for targeted treatment of cancer \$530k.
6. 2021-2022 ARC LE210100153 Integrated In situ Characterisation Facilities for Energy Studies \$497k.

### **UoW GC grants funding**

2018-2020 New Generation Sunscreens Optimised for Australian Radiation Conditions \$74k.

### **Patents:**

- "Cathode materials for rechargeable lithium batteries and a process for production" G. X. Wang, K. Konstantinov, S. X. Dou and H. K. Liu, Australian Innovation Pat. No. 2002100000.
- "Method for production of spherical nickel hydroxide for rechargeable nickel-metal hydride batteries" S. Zhong, K. Konstantinov, C. Y. Wang, S. X. Dou and H. K. Liu, Australian Innovation Pat. No. 2002100001.
- "Fabrication of cathode materials for Li-ion batteries" S. X. Dou, K. Konstantinov, H. K. Liu and G. X. Wang, Australian Innovation Pat. No. 2002100190.
- "Development of new positive compounds for Lithium-ion batteries" K. Konstantinov, S. X. Dou, H. K. Liu, G.X. Wang and S. L. Bewlay, Australian Innovation Pat. No. 2002100403.

**Governance and Service Impact** I am taking a number of roles and participate in various committees to provide further contribution and service for our University.

- Since 2019 I am a member of the ISEM Executive Team, responsible for the smooth operation, planning and coordination of all ISEM activities.

- Since 2019 I am Research coordinator of Biomaterials for Health Program at ISEM. Previously I was coordinator for Biomaterials ISEM research program.

- As ISEM HPS since 2018, I am responsible for the mentoring and coordination of more than 65 HDR students and their respective supervisors. Our students have been highly successful in accomplishment of their projects and degree achievement.

- As an AIIM representative am I a member in the HDRT advisory committee created at UoW for development and implementation of UOW HDR Supervisor Development Program and framework. The developed platform will be implemented during 2020.

- I am a member of the AIIM Research and Training Committee and the AIIM Educational Committee I am actively participation in all meetings and tasks related to these committees.

- Since this year I am also a member of the UoW Academic Senate

- I am Laboratory and facility supervisor of three ISEM labs and in charge of student equipment trainings in these labs. Literally hundreds of students have received trainings and utilised the facilities through online booking system.

- I have been ISEM Lab designer for Bld 31 at the Innovation Campus and key coordinator for the selection, purchase and operation 1.5 million state-of-the art UoW analytical and synthesis facilities including a JEOL FE-SEM 7500F, Mettler Toledo DSC/TGA, Varian ICP-OES, XRD GB instrument pilot scale spray pyrolysis facility and others. I have been also ISEM WHS member at EIS

### **Research Group and Project Leadership**

As group leader of "Nanoceramics for Health Protection (NCHP) team, I have successfully provided support for 9 research assistants, 20 PhD students and 4 Master's students to conduct research work in the past few years on multidisciplinary projects, while coordinating 4 academic co-supervisors of these students from ISEM, CMRP, MMM and Chemistry. As a group leader I supervise 15 members, including 2 Master's and 10 PhD students.

As an ARC DP leader, I have managed 3 CIs from UoW, in project on advanced nanostructured ceramic composites for ultracapacitors (DP1093952). The successful management and leadership were reflected by the large number of papers (21) and successful completions of four high quality PhD students. One of them won UPA award with my support and nomination. Two of the students were appointed as Research Fellows after finishing their thesis at AIIM.

### Community/outreach service:

- Reviewer for more than 20 prestigious journals such as Solid State Ionics, ACS Nano, Journal of Power Sources, Electrochimica Acta, Electrochem. & Solid-State Letters, J. Electrochem. Society. Adjudicative reviewer for Energy & Environmental Science. I review about 25 manuscripts each year.

### - Development of collaborative partnerships with industry:

In collaboration with Chemistry Department I have established partnership with an Australian industry partner specializing in sunscreen products for the Australian market - Natuva Ltd. Pty. They have supported my AIIM partnership project (\$12k) "New generation sunscreens optimized for Australian conditions".

### - Contribution towards developing a nationally funded research entity

I was actively engaged in the successful bid for the Automotive Australia 2020 CRC. I provided valuable expertise and scientific input for the development of high energy and high power energy storage materials for electric vehicles and hybrid electric vehicles. I was involved in the proposal preparation. As a Key Researcher, I was in charge of a project on supercapacitors, and I was supervising one Auto CRC PhD student on the development of advanced materials for composite supercapacitors and another student on development of Li-S batteries.

### - International Collaborations:

# University of Orleans, Chartre, France - Prof. Thierry Devers  
# Leibniz University, Germany, Dr. Manuela Juestel and Prof. Peter Behrens  
# University of Clermont Auvergne, France – Prof. Komla Awitor

**Learning and Teaching Impact** I have CPD Learning and Teaching Level 1. My learning and teaching activities and achievements are focused in the following main areas:

### - Undergraduate teaching at EIS

I have been involved regularly as lecturer, guest lecturer or subject coordinator in various EIS subjects, such as, MATE204, MATE411/MATL903, MATE303/MATL906, ENGG103, MATE402 and in the past NANO10-1, NANO201 and NANO301. My total teaching load is usually 1-1.5 subjects per year.

### - Curriculum design

I have been emphasizing on case-based learning designing case studies related to future research work and activities for several subjects like MATE411/MATL903, AIIM 910 and NANO101. I am also emphasizing on student directed learning through adaptation where it is possible of subjects as NANO301 as annual rather than session timed, to provide an opportunity for the students to get involved in more serious full scale research activities and encouraging them to write and publish research articles inspiring them to take further HDR degree at our University.

### - Contribution to development of the AIIM major in the Masters/Bachelor of Research degrees

I was involved in the development of the AIIM major in the Master's/Bachelor of Research degree of Advanced Materials as Program coordinator I have contributed to development and teaching as subject coordinator of new subjects: AIIM910/AIIM401 Multifunctional Materials: Design and Fabrication and AIIM911/AIIM411 Advanced Materials: Devices and Applications.

### - Undergraduate-postgraduate transition and teaching research pedagogy

The successful student transition to research and HDR is strongly related to the Learning-Teaching-Research Nexus dimension. I have been working in and contributing to this field through implementation in subject materials (MATE303, NANO101, NANO201, MATE411) of lectures reflecting the current promising research directions being developed at our University and specifically in ISEM/AIIM.

**My strategy for early engagement and successful transition to HDR was listed as one of the best UoW practices in the brochure Best Practice in UoW HDR Supervision, published by UoW from the Graduate Research School in 2019 under the patronage of DVCRI.**

### - Building multidisciplinary teams for HDR students and projects

The successful transition of undergraduate students to HDR also requires the development of an appropriate

teaching research pedagogy and building teams, especially in the case where the students are undertaking multidisciplinary projects, requiring the careful choice of multiple supervisors. Such projects often involve the assembly of teams of students working on related research tasks at different levels, where they learn to collaborate, work in groups, and exchange ideas, which promotes heightened development of the students, not only in their personal knowledge of the subject, but also in their ability to learn and cooperate with fellow peers which is an essential translational skill required throughout their student life and for their future professional career. I have been successful in building large multidisciplinary projects for our GC program at UoW and for NHMRC project and activities with other leading institutes from UoW, such as CMRP, Chemistry