## **Contributors**

## **Editorial**

Paul D. Ryan (paul.ryan@nuigalway.ie) was a founder member of and is a member of the management board of the 'Tuning Project'. He co-chaired the Earth Sciences Subject Area Group from 2000-2009 and was principal author of the validated Tuning Template for Earth Science Higher Education in Europe. He has given over 40 invited presentations on Tuning and the Bologna Process globally and has acted as adviser to many Government Agencies, Thematic Networks and Tuning Projects. He was appointed Founder Editor of the Tuning Journal for Higher Education in 2011. He worked at National University of Ireland, Galway (NUI Galway) from 1970 until 2009 where he became Professor of Geology and University Bologna Advisor. He is now Emeritus Professor and an active researcher in the Geosciences and in Higher Education with over 6500 citations. Paul has a Ph.D. in Geology (Keele University, UK).

Modernising higher education: the emergence of European public goods

Peter van der Hijden (petervanderhijden@outlook.com) is an independent European expert in higher education and research. A Dutch citizen, Peter studied law in Nijmegen and Leiden and graduated from Maastricht University. In Maastricht, he worked for 10 years as Vice-Registrar of the University Council and Research Policy Officer at the Faculty of Law. During 23 years, Peter has worked for the European Commission in Brussels, where he helped to build the Erasmus Programme and where he has been Head of Sector Higher Education Policy in Directorate General Education and Culture (modernising universities, Bologna process). Peter also worked in DG Transport and Energy (inland waterways) and DG Research and Innovation (European Research Area and Horizon 2020). At present, Peter acts as an advisor to the Commission, governments, universities and NGOs, notably garagErasmus, the professional network of the Erasmus generation.

Building a Higher Education Area in Central Asia: challenges and prospects

Ann Katherine Isaacs (k.isaacs@unipi.it) was born in Astoria, Oregon (USA). She studied at the University of California, Berkeley, and the State University of Milan. Research and teaching fellow at the Superior Normal

School of Pisa from 1971 to 1975, from 1975 she has been professor of Renaissance History at the University of Pisa. Active in various key projects for the modernisation of higher education, she participated in the ECTS Pilot Project from 1989: she coordinated the European History Networks from 1999 to 2012, including designing and coordinating the Sixth-Framework Network of Excellence, CLIOHRES.net, in which 180 researchers from 31 countries addressed issues of citizenship, identity and inclusion/exclusion (www.cliohres.net). She has been deeply involved in the Tuning Process around the world (Europe, Latin America, Canada, USA, Russia, and Central Asia): she is ECTS/DS counsellor and Bologna expert: she received the Erasmus Gold Award for Innovation and Creativity in 2008, and a Doctorate honoris causa from the University of Latvia, Riga, for her contributions to the EHEA and the ERA. Currently she is Rector's Delegate for European Programmes at the University of Pisa. She has designed and coordinates the large-scale Tempus project to build a Central Asian Higher Education Area (www.tucahea.org), as well as a new project on Public Health in Uzbekistan. She is Erasmus+ Ambassador for Italy.

Incremental steps towards a competency-based post-secondary education system in Ontario

Mary Catharine Lennon (marycath.lennon@mail.utoronto.ca) is a PhD Candidate at the University of Toronto (Canada). She has led projects on establishing and measuring learning outcomes including a 'Tuning' project with three sectors of academic disciplines, and was the Canadian National Expert and National Project Manager for the OECD's AHELO Feasibility Study. Mary Catharine is also co-editor of 'Measuring the Value of Postsecondary Education', a collection of international examples of learning outcome activities published by McGill-Queens University Press. She has been involved in higher education policy development, advice and research in provincial, inter-provincial and international educational agencies including the Higher Education Quality Council of Ontario, the Council of Ministers of Education, Canada, and the Association of Commonwealth Universities. The majority of her work extends towards international and comparative system level policy issues in postsecondary education including system design, quality assurance, learning outcomes, governance and assessment.

Lifelong Learning principles and higher education policies

CARLOS VARGAS TAMEZ (carlos.vargas@deusto.es) is a Mexican Sociologist and Educationist who specialises in adult education and lifelong

learning. After having worked on adult education and lifelong learning in Mexico and Latin America for over a decade, Carlos moved to the Basque Country in 2010 where he continues his research of lifelong learning and adult education in Europe with a comparative lens. For the past four years, Carlos Vargas has been a lecturer in the European Master's in Lifelong Learning at the University of Deusto (Bilbao), and a visiting scholar to the University of London Institute of Education (IOE), Aarhus University (Denmark), and Melbourne Graduate School of Education (Australia). He currently researches and teaches education and LLL policy analysis using the human rights based approach. Carlos is part of the INNOVA research team at the University of Deusto, and is Associate Research Fellow of the ESCR Centre on Skills, Knowledge and Organisational Performance (SKOPE) based at the University of Oxford's Department of Education. He has recently been a Peter Jarvis / Taylor & Francis CONFINTEA Scholar at the UNESCO Institute for Lifelong Learning, and part of the Expert Working Group on Adult Learning and Education at the same Institute.

## Competence-based multiple learning paths: on the road of implementation

María Dolores de Prada (dprv0000@gmail.com) is former Professor of Mathematics and Inspector of Education in Spain and Spanish centres in France, Portugal, and Andorra. Professor M. Dolores de Prada has held various high level positions in the Spanish Ministry of Education such as: Chief of Staff for Plans and Programmes; Director of Quality; Advisor to the Executive Secretary General; Chief of Staff of the Secretary General; and Member of the Spanish Sub-Committee of the ICMI (International Commission on Mathematics Instruction). She is also Member of the School Council of State. Prof. M. Dolores de Prada has taught in Masters Programmes at the University of Carlos III of Madrid and many courses to executives, managers, and teachers around the world. She has published in influential journals of Mathematics and Education and has authored 68 books on Mathematics, teacher training, evaluation of teachers, and organisation of secondary education. Prof. M. Dolores de Prada is Director of the IEPS Foundation (http://ieps.es/), a centre devoted to educational research and teachers training.

Julia González (juliamaria.gonzalez@deusto.es) is Co-coordinator of Tuning Higher Education in the World and President of Education for an Interdependent World. She is also a high-level expert and adviser at the national, European, and international level on higher education. She was Vice-Rector for International Relations at the University of Deusto, Spain

(2003-2012) and has initiated and coordinated several international networks and educational and research projects such as the Thematic Network on Humanitarian Development Studies, the Erasmus Mundus Master in International Humanitarian Action, the European Doctorate on Migration. Identities, and Diversity and two Marie Curie Training networks. She was one of the initiators of the European Master in Human Rights and Democratisation and the Secretary General of the NOHA International Association of Universities. Dr. González holds a PhD from the University of Oxford (UK).

Ideological trends in initial teacher education curricula: the case of East African universities

Proscovia Namubiru Ssentamu (psnamubiru@umi.ac.ug), is a senior quality assurance officer and lecturer at Uganda Management Institute. Proscovia previously worked as a lecturer in the Department of Curriculum Studies, School of Education, Makerere University for 14 years. Her main research areas include curriculum design, development and evaluation, pedagogy and didactics, education evaluation and assessment, quality assurance, and teacher professional growth and development. Namubiru has undertaken assignments for the Uganda Ministry of Education & Sports, Uganda National Council for Higher Education, USAID, the Belgian Technical Cooperation, Netherlands Initiative for Capacity Development in Higher Education and several public and private higher education institutions in Uganda and beyond. She has a Doctorate of Philosophy in Education, specialising in teacher education from Bayreuth University, Germany.

Collaborative meta-profile development to harmonise mechanical engineering education in Africa

Samuel M. Sackey, Venkata Ramayya Ancha, Moses P.M. Chinyama, Charles Awono Onana, Raïdandi Danwe, Mohammad M. Megahed, Béatrice Delpouve, Shadreck Chama, Nawaz Mahomed, Venant Kayibanda, Léonard Kabeya Mukeba Yakasham, and André Müller.

SAMUEL M. SACKEY (sackeysm@yahoo.com) is a Senior Lecturer of the Mechanical Engineering Department, Kwame Nkrumah University of Science and Technology (KNUST). He received a Bachelor of Science degree in Mechanical Engineering from the KNUST, Ghana in 1988, a

Master of Science degree in Engineering and Management of Manufacturing Systems from the Cranfield University, Great Britain, in 1996, and a Doctor of Philosophy degree in Mechanical Engineering from the North Carolina Agricultural and Technical State University in 2004. He teaches mechanical design and production engineering, as well as engineering materials, quality assurance, and manufacturing systems related courses. His research interests broadly include minimization of damage in material-process interactions, product and process quality improvement in engineering manufacture, and maintenance management including in agricultural machinery systems. Others are: investigating processing difficulties associated with composite materials, product quality management, product innovation and product development, value stream systems, and technology transfer. Others are mechatronics, automation and control systems in mechanical engineering and manufacturing systems involving the application of PLCs, logic control systems and microprocessors and recently, impact of engineering higher education on economic development. Dr Sackey is the current Head of the Mechanical Engineering Department, of the Kwame Nkrumah University of Science and Technology (KNUST), Ghana.

VENKATA RAMAYYA ANCHA (venkata9999@yahoo.com) is a Professor of Mechanical Engineering and Sustainable Energy Engineering Chair in the Department of Mechanical Engineering at Jimma Institute of Technology (JiT), Jimma University. He graduated in 1983 with B.Tech (Mechanical) from NIT. Warangal, in 1986 with M.E (Thermal Systems Engineering) from I.I.Sc, Bangalore and in 1990 with Ph.D in Mechanical Engineering from I.I.T, Madras, all located in India. He teaches Power Plant engineering, Thermo-fluid System Design, Refrigeration and Air Conditioning, Gas Dynamics and Jet Propulsion, Turbo machines, Fluid Mechanics, Heat and Mass Transfer for UG students; Energy Systems Modeling and Simulation, Renewable Energy Systems Design including Solar, Bio, Wind and Fuel cells apart from Research Methods for M.Sc students. He has several best teacher awards, best paper awards apart from National award from Professional societies and around 104 research publications in Journals/ Conference Proceedings biographical listings in Marqui's Who's Who in Science and Engineering, USA etc. He was promoted to full Professorship in 1999 and has been working in JU, Ethiopia since November 2001 on wards. His research interests are: Fluidized Bed Heat Transfer and Dynamics, Exergy Analysis, Computational Fluid Dynamic Simulations, Energy Systems Optimization, Biomass Gasification and Pyrolysis, Solar Thermal Engineering, Wind Turbine Design Optimization, Micro Hydro power and Cross Flow Turbines, Energy Storage with PCM, Fuel Cells.

Moses P. M. Chinyama (mchinyama@poly.ac.mw) is a Senior Lecturer and former Dean of the Faculty of Engineering and Vice Principal of the University of Malawi — the Polytechnic. He is a Chartered Engineer registered with the Engineering Council of UK. He obtained his PhD in Thermo-fluids from Imperial College of Science Technology and Medicine of the University of London in 2006. He also has a Masters degree in Manufacturing Systems Engineering from the University of Warwick (UK) obtained in 1996 and BSc in Engineering (Mechanical) from the University of Malawi obtained in 1990. He has published a number of articles in refereed journals and a contributed two chapters in books titled 'Cleaner Production and Consumption in East and Southern Africa: Challenges and Opportunities', and 'Alternative Fuel'. He has contributed to the body of knowledge in Combustion and Cement Processing through research and publications. Dr Chinyama has recently been appointed Team Leader of the newly established Malawi University of Science and Technology on secondment from the University of Malawi. He has special research interest in manufacturing and processing, bio-energy, combustion and the environment.

Awono Onana (awonoonana.charles@gmail.com) is Professor of Applied Mathematics at the University of Yaounde I. He is involved in the TUNING Africa project and coordinates the mechanical engineering group. Professor Awono ONANA is currently leading the National Advanced School of Engineering at the University of Yaounde I, Cameroon. He is the coordinator of the African Centre of Excellence in Information and Communication Technology set up as part of an initiative World Bank to promote the quality and relevance of higher education in Africa. Professor Awono ONANA coordinates several research projects involving many universities of the continent in the areas of mathematics, information technology and communication and fundamental applications.

RAIDANDI DANWE (rdanwe@yahoo.fr) is a Civil Engineer, and holds a PhD (Doctorat) degree in Civil and Mechanical Engineering from the École Normale Supérieure de Cachan (France) since 1993. He is Professor at the Ecole Nationale Supérieure Polytechnique of the University of Yaoundé I. In the Department of Industrial and Mechanical Engineering, he teaches Elasticity, Vibrations, mechanical modeling and Simulations, Structures analysis, Plasticity, Thermodynamics and mechanics of continuous media, Structural optimization, Maintenance, Reliability and Quality. His research activities include Materials and Structures (Modeling of structures, composites, structural analysis, non-linear mechanics), Computer-integrated manufacturing (Optimization, Maintenance, quality). He's been Head of the

Mechanical Engineering Department at the University of Douala, Head of the Coordination and Promotion of Research Department at the University of Yaoundé I. He has also been Member of Cameroonian Parliament, and 1st Secretary of the Education Committee. He is the current Director of the Higher Institute of the Sahel of the University of Maroua, Cameroon.

MOHAMMAD M. MEGAHED (mmegahed47@gmail.com; mmegahed@Eng. cu.edu.eg) is Emeritus Professor of Solid Mechanics in the Department of Mechanical Design and Production of the Faculty of Engineering, Cairo University. He obtained his Ph.D. from the University of Leicester, England, UK in 1978. He teaches, develops courses, conducts and supervises research in the areas of stress analysis, elasticity, plasticity, failure analysis, finite elements, pressure vessels and piping, fatigue, creep, fitness for service, etc. He has published more than 80 papers in reputable international journals and conferences and supervised more than 22 M.Sc. and Ph.D. students. In March 2014, his h-index lies at 14 and more than 560 citations. Some of his research was made in response to national needs of the industry in Egypt. In appreciation of his activities, he won the "State Prize for Encouraging Engineering Research" in 1990, and in the year 2000, he won the "State Prize for Distinction in Engineering Sciences". He held a number of senior administrative positions at Cairo University. He was the executive director of the Center for Advancement of Post Graduate Studies and Research in Engineering Science at Cairo University (CAPSCU) during the period 1998 — 2005 during which CAPSCU successfully provided more than 600 consulting task to the national and regional industry. He served as "Vice Dean for Academic and Student Affairs" at the college of Engineering, Cairo University during the period 2005-2007. In 2008, he was chosen as the "General Secretary: of the SCU (Supreme Council of Universities) engineering sector committee.

BÉATRICE DELPOUVE (delpouve421707@gmail.com) is Doctor in Biochemistry and Engineer in Food Processing Industry and has been working since 1988 at the central level of the University of Lille (France), for the development of the European programs for Research and then for Higher Education. She participates in the creation and implementation of joint curricula and is involved in the comparison of the three cycles and study programmes: European levels, TEMPUS, EUA and TUNING projects in Europe and its feasibility in Africa, JOIMAN project. She is also involved in different international projects leading to international cooperation and mobility. She works in all continents, especially European, African countries, Brazil and China. She is regularly consulted as a Bologna expert by the European Commission to help HE institutions to implement ECTS, the DS, joint degrees and European Projects including outside Europe.

SHADRECK CHAMA (dvc@cbu.ac.zm) holds a PhD in Material Science and Engineering from the University of Liverpool, UK (2001), a Master of Science degree in Advanced Engineering Materials from the University of Liverpool, (UK) (1996), and a Bachelor of engineering degree in Mechanical engineering from the University of Zambia (1994). He joined the Copperbelt University in 1995 as a Staff Development fellow and has been there since. During this period, he has taught several courses including Material Science. Fracture Mechanics and production and operations management at the undergraduate and postgraduate levels. He has held a number of positions in the University including that of Assistant Dean, Head of postgraduate studies. Dean of the School of Engineering, a member of Senate and a member of the University Council, acted as Vice Chancellor and is currently the Deputy Vice Chancellor for the Copperbelt University. On the international scene he is a member of the AAU-supported and European Union-funded project called Tuning Africa, whose broad terms are to foster harmonisation of curricular across African Universities with the specific aim of gravitating towards competency-based teaching for all degree programmes. He is also an executive member of the UNESCO founded World Academy of Young Scientists (WAYS) and the Secretary General of WAYS-Africa Unit. His research interests include: Development of novel light alloys for aerospace applications, Study of oxidation, Microstructural evolution during processing and microstructure-property relations, and Manufacture and characterization of aluminium metal foams.

NAWAZ MAHOMED (mahomedn@cput.ac.za) has a BSc Eng Degree and MSc Eng Degree from the University of Cape Town, and a PhD from the Institute of Fundamental Technological Research, Polish Academy of Sciences (Poland), specialising in modelling and computational simulation of high viscous flows with applications in injection moulding and metal casting. He held positions of Head of Department of Mechanical Engineering at CPUT, Director of R&D at Central University of Technology, and Portfolio Manager in Materials Science and Manufacturing at the Council for Scientific and Industrial Research. He later joined the Department of Science and Technology for 5 years as Director for Local Innovation, Manufacturing and Technology Localisation, where he was involved in the establishment of a range of research & technology programmes in advanced manufacturing, materials, and regional innovation. Thereafter, he headed up the Institute for Maritime Technology linked to the Defence Industry. He is currently Dean of Engineering at CPUT.

VENANT KAYIBANDA (kayive@yahoo.fr) is Senior Lecturer and Head of Mechanical Engineering Department at Kigali Institute of Science and

Technology (KIST), Rwanda. He graduated in 1995 with Bsc, in 1996 with Msc, and in 2010 with PhD from Don State Technical University (DSTU), Rostov-on- Don, Russia. He teaches Mechanical Vibrations, Applied Thermodynamics, Automobile Technology, Maintenance Management and Reliability, Engineering Operations and Management, Dynamics of Machines and Engineering; Renewable Energy Systems Design including Geothermal, Solar, Bio and Wind. He has research publications in Engineering Journals. He was promoted to Senior Lecturer in 2011 and he has been working in KIST since November 2003. His research interests focus on Vibration in Mechanical Engineering. He has been conducting research on the application of Mechanical Vibration for the improvement of efficiency of technical equipment such as Compressors and Compactors, as well as on the implementation of Vibrating Technology in automotive repairs and services.

LEONARD KABEYA MUKEBA YAKASHAM (l\_y\_m\_kabeya@hotmail.com) is Dean of the Faculty of Mechanics and Professor of 3rd cycle at the l'Université Pédagogique Nationale (UPN) of Ngaliema, Democratic Republic of Congo. He has a 6-year experience as Technical Director in the factory GENERAL MOTORS (1985-1991) and was Production and Technical Director at the Research Centre for Defence issues (CRPD) from 1999 to 2002. Professor Kabeya Mukeba is a postdoctoral researcher with ALTECH sa Waremme and AEC, and an international expert for the International Organisation of Migration (IOM-Mida) to ISEA Busogo and Kigali Institute of Science and Technology, Rwanda. He is also a national and international adviser for community development projects. His areas of research cover the following: Computational Fluid Dynamics, Energy, Mass and Heat Transfer, Thermodynamics, Internal Combustion Engine, Design and Manufacturing Engineering, community development. Prof Kabeya graduated in Mechanical Engineering of Aviation from the National University of Zaire ISTA-Kinshasa, Democratic Republic of Congo; obtained his Master's degree in Mechanics from École Normale de Paris (France) in 1984, and a PhD in Science of Fluids Mechanics from the University of Liège (Belgium).

André Müller (aemuller sun.ac.za) is Head of the Centre for Academic Planning and Quality Assurance at Stellenbosch University in South Africa. He coordinates the approval of new programme submissions and changes proposed to existing academic programmes (across ten faculties). He also facilitates the quality assurance and quality enhancement processes with regard to external evaluations of departments and support services, and institutional and national reviews

Research ability in Chemistry and the Tuning Latin America specific competences: a comparative study at University of Cuyo (Argentina)

IRIS VALERIA DIAS (irisdias\_228@yahoo.com.ar) works at the Facultad de Ciencias Exactas y Naturales (FCEN), Universidad Nacional de CUYO (UNCUYO, Mendoza, Argentina where she is a lecturer in Chemistry and a PhD student in Education (at the Facultad de Filosofía y Letras). She is a member of the research project "Development of general education and research ability in an interdisciplinary context in undergraduate studies". Her research focuses on Education in Basic Sciences and Higher Education.

Armando Fernández Guillermet (armando.fernandez.guillermet@ gmail.com) is Principal Researcher at the National Council for Scientific and Technical Research (CONICET) of Argentina, Professor at Instituto Balseiro (Bariloche, Argentina) and visiting Professor at Facultad de Ciencias Exactas y Naturales (FCEN), Universidad Nacional de Cuyo (UNCUYO, Mendoza, Argentina). He has published papers in international refereed journals and book chapters in the field of thermodynamics and thermochemistry of solids and materials. He is a recipient of the "Werner-Köster-Preis: Best Paper Award" of the German Society for Materials and Carl-Hanser-Verlag (1994). Since 2006, he chairs the University Council for Exact and Natural Sciences (CUCEN) of Argentina and has chaired the Physics Subject Area Group of the Tuning Latin America Project (2006-2013). He edited the book Higher Education in Latin America: reflections and perspectives on Physics (2014) with the results of the Physics Subject Area Group. Dr Fernández has presented papers on the Tuning Project and the competence approach at various academic meetings. At FCEN-UNCUYO, he currently coordinates an interdisciplinary research group on Education in Sciences and Higher Education. Dr Fernández holds a Ph.D. and a "Docent" (post-doctoral) degree in Physical Metallurgy from the Royal Institute of Technology (Stockholm, Sweden).

Carina Rubau (crubau@yahoo.com.ar) works at the Facultad de Ciencias Exactas y Naturales (FCEN), Universidad Nacional de CUYO (UNCUYO, Mendoza, Argentina). She teaches in Education at the Universidad Nacional de Mar del Plata, UNMdP, Argentina. She is specialist in Higher Education Teaching (UNMdP) and is presently doing a PhD degree on Education (at the Facultad de Filosofía y Letras — UNCUYO). She also lectures in "History of Science" at FCEN-UNCUYO, and is a member of the research project "Development of general education and research ability in an interdisciplinary context in undergraduate studies". Her research focuses on Education in Basic Sciences and Higher Education.

María Mercedes Tovar Toulouse (mechisbrc@gmail.com) works at the Facultad de Ciencias Exactas y Naturales (FCEN), Universidad Nacional de Cuyo (UNCUYO, Mendoza, Argentina) where she is a teacher of English and a PhD candidate in Education. She coordinates the programme 'Students' Academic Trajectories' (TRACES for its acronym in Spanish) and is a member of the research project "Development of general education and research ability in an interdisciplinary context in undergraduate studies". Her research covers Education in Basic Sciences, Second Language Learning, and Higher Education.