

## Engineering Science Memo April 2008

It is with great pleasure that we present to you a collection of over 200 high quality technical papers from more than 10 countries that were presented at the Biomed 2008. The papers cover almost every aspect of Biomedical Engineering, from artificial intelligence to biomechanics, from medical informatics to tissue engineering. They also come from almost all parts of the globe, from America to Europe, from the Middle East to the Asia-Pacific. This set of papers presents to you the current research work being carried out in various disciplines of Biomedical Engineering, including new and innovative researches in emerging areas. As the organizers of Biomed 2008, we are very proud to be able to come-up with this publication. We owe the success to many individuals who worked very hard to achieve this: members of the Technical Committee, the Editors, and the International Advisory Committee. We would like to take this opportunity to record our thanks and appreciation to each and every one of them. We are pretty sure that you will find many of the papers illuminating and useful for your own research and study. We hope that you will enjoy yourselves going through them as much as we had enjoyed compiling them into the proceedings. Assoc. Prof. Dr. Noor Azuan Abu Osman  
Chairperson, Organising Committee, Biomed 2008

Maritime Technology and Engineering 3 is a collection of papers presented at the 3rd International Conference on Maritime Technology and Engineering (MARTECH 2016, Lisbon, Portugal, 4-6 July 2016). The MARTECH Conferences series evolved from biannual national conferences in Portugal, thus reflecting the internationalization of the maritime sector. The keynote lectures and the papers, making up nearly 150 contributions, came from an international group of authors focused on different subjects in a variety of fields: Maritime Transportation, Energy Efficiency, Ships in Ports, Ship Hydrodynamics, Ship Structures, Ship Design, Ship Machinery, Shipyard Technology, Safety & Reliability, Fisheries, Oil & Gas, Marine Environment, Renewable Energy and Coastal Structures. Maritime Technology and Engineering 3 will appeal to academics, engineers and professionals interested or involved in these fields.

A report that considers the broad issue of why science and engineering are important and why they should be at the heart of Government policy. It also considers three more specific issues: the debate on strategic priorities; the principles that inform science funding decisions; and, the scrutiny of science and engineering across Government.

Incorporating HC 470-i-iii, 640-i-iii, 599-i-iii, 1064-i, 1202-i, 1194-i of session 2007-08

The OECD Science, Technology and Industry Outlook 2010 reviews key trends in science, technology and innovation in OECD countries and a number of major emerging economies including Brazil, China, India, Russia and South Africa. A former government regulator reveals how the tobacco industry's duplicitous tactics created a multimillion-dollar industry

that is dismantling public health safeguards, in an exposé of how the regulatory system has been further undermined by the Bush administration to favor polluters, the manufacturers of dangerous products, and unscrupulous corporate interests.

Convergence of the life sciences with fields including physical, chemical, mathematical, computational, engineering, and social sciences is a key strategy to tackle complex challenges and achieve new and innovative solutions. However, institutions face a lack of guidance on how to establish effective programs, what challenges they are likely to encounter, and what strategies other organizations have used to address the issues that arise. This advice is needed to harness the excitement generated by the concept of convergence and channel it into the policies, structures, and networks that will enable it to realize its goals.

Convergence investigates examples of organizations that have established mechanisms to support convergent research. This report discusses details of current programs, how organizations have chosen to measure success, and what has worked and not worked in varied settings. The report summarizes the lessons learned and provides organizations with strategies to tackle practical needs and implementation challenges in areas such as infrastructure, student education and training, faculty advancement, and inter-institutional partnerships.

Providing an overview of the process of e-inclusion for older people and addressing the ethical, social and legal aspects of the process, this book is suitable for researchers, policy-makers, organisations and companies, as well as for those with an interest in the identification and promotion of good practice within an ageing society.

Over the Beach, written by historian and retired Army Colonel Donald W. Boose Jr., is the definitive history of the extensive but little known US Army amphibious operations during the Korean War, 1950-1953. Building on its extensive experience in World War II, the Army conducted three major landing operations during the war, including the assault at Inchon in September 1950. After the massive Chinese attacks two months later the Army executed a series of amphibious withdrawals as it fell back to more defensible positions farther down the peninsula. Throughout the war the Army also conducted a number of massive and complex over-the-shore logistical operations, as well as several amphibious special operations along the Korean littoral. Colonel Boose's work, commissioned by DAMO-ODG, Operations and Technology Office, provides the historical context for any subsequent amphibious operations on the Korean peninsula. As such, this thought-provoking study may provide insights to modern planners crafting future joint or combined operations in that part of the world. -- Publisher's Description.

Unmanned Aircraft Systems (UAS) have seen unprecedented levels of growth during the last decade in both military and civilian domains. It is anticipated that civilian applications will be dominant in the future, although there are still barriers to be overcome and technical challenges to be met. Integrating UAS into, for example, civilian space, navigation, autonomy, see-detect-and-avoid systems, smart designs, system integration, vision-based navigation and training, to name but a few areas, will be of prime importance in the near future. This special volume is the outcome of research presented at the International Symposium on Unmanned Aerial Vehicles, held in Orlando, Florida, USA, from June 23-25, 2008, and presents state-of-the-art findings on topics

such as: UAS operations and integration into the national airspace system; UAS navigation and control; micro-, mini-, small UAVs; UAS simulation testbeds and frameworks; UAS research platforms and applications; UAS applications. This book aims at serving as a guide tool on UAS for engineers and practitioners, academics, government agencies and industry. Previously published in the Journal of Intelligent and Robotic Systems, 54 (1-3, 2009).

Emerging Trends in Computing, Informatics, Systems Sciences, and Engineering includes a set of rigorously reviewed world-class manuscripts addressing and detailing state-of-the-art research projects in the areas of Industrial Electronics, Technology & Automation, Telecommunications and Networking, Systems, Computing Sciences and Software Engineering, Engineering Education, Instructional Technology, Assessment, and E-learning. This book includes the proceedings of the International Joint Conferences on Computer, Information, and Systems Sciences, and Engineering (CISSE 2010). The proceedings are a set of rigorously reviewed world-class manuscripts presenting the state of international practice in Innovative Algorithms and Techniques in Automation, Industrial Electronics and Telecommunications.

This collection is the first systematic examination of the evolving relationship between the federal government and Canadian universities as revealed through changes in federal research and innovation policies.

These ideas might sound like science fiction, but in fact they are part of a very old story. For more than a century, scientists, soldiers, and charlatans have tried to manipulate weather and climate, and like them, today's climate engineers wildly exaggerate what is possible. Scarcely considering the political, military, and ethical implications of managing the world's climate, these individuals hatch schemes with potential consequences that far outweigh anything their predecessors might have faced.

Explore the military and combat applications of modeling and simulation Engineering Principles of Combat Modeling and Distributed Simulation is the first book of its kind to address the three perspectives that simulation engineers must master for successful military and defense related modeling: the operational view (what needs to be modeled); the conceptual view (how to do combat modeling); and the technical view (how to conduct distributed simulation). Through methods from the fields of operations research, computer science, and engineering, readers are guided through the history, current training practices, and modern methodology related to combat modeling and distributed simulation systems. Comprised of contributions from leading international researchers and practitioners, this book provides a comprehensive overview of the engineering principles and state-of-the-art methods needed to address the many facets of combat modeling and distributed simulation and features the following four sections: Foundations introduces relevant topics and recommended practices, providing the needed basis for understanding the challenges associated with combat modeling and distributed simulation. Combat Modeling focuses on the challenges in human, social, cultural, and behavioral modeling such as the core processes of "move, shoot, look, and communicate" within a synthetic environment and also equips readers with the knowledge to fully understand the related concepts and limitations. Distributed Simulation introduces the main challenges of advanced distributed simulation, outlines the basics of validation and verification, and exhibits how these systems can support the operational environment of the warfighter. Advanced Topics highlights new and developing special topic areas, including mathematical applications for combat modeling; combat modeling with high-level architecture and base object models; and virtual and interactive digital worlds. Featuring practical examples and applications relevant to industrial and

government audiences, *Engineering Principles of Combat Modeling and Distributed Simulation* is an excellent resource for researchers and practitioners in the fields of operations research, military modeling, simulation, and computer science. Extensively classroom tested, the book is also ideal for courses on modeling and simulation; systems engineering; and combat modeling at the graduate level.

Linda Ambrose, Matt Bray, Sara Burke, Donald Dennie, et Guy Gaudreau *The fascinating story of Laurentian University's growth and innovations in post-secondary education.*

*Growing Up America* brings together new scholarship that considers the role of children and teenagers in shaping American political life during the decades following the Second World War. *Growing Up America* places young people—and their representations—at the center of key political trends, illuminating the dynamic and complex roles played by youth in the midcentury rights revolutions, in constructing and challenging cultural norms, and in navigating the vicissitudes of American foreign policy and diplomatic relations. The authors featured here reveal how young people have served as both political actors and subjects from the early Cold War through the late twentieth-century Age of Fracture. At the same time, *Growing Up America* contends that the politics of childhood and youth extends far beyond organized activism and the ballot box. By unveiling how science fairs, breakfast nooks, Boy Scout meetings, home economics classrooms, and correspondence functioned as political spaces, this anthology encourages a reassessment of the scope and nature of modern politics itself.

The draft Apprenticeships Bill published as Cm. 7452 (ISBN 9780101745222)

*Techno-utopianism is dead: Now is the time to pay attention to the inequality, marginalization, and biases woven into our technological systems.* This book sounds an alarm: after decades of being lulled into complacency by narratives of technological utopianism and neutrality, people are waking up to the large-scale consequences of Silicon Valley-led technophilia. This book trains a spotlight on the inequality, marginalization, and biases in our technological systems, showing how they are not just minor bugs to be patched, but part and parcel of ideas that assume technology can fix—and control—society. Contributors Janet Abbate, Ben Allen, Paul N. Edwards, Nathan Ensmenger, Mar Hicks, Halcyon M. Lawrence, Thomas S. Mullaney, Safiya Umoja Noble, Benjamin Peters, Kavita Philip, Sarah T. Roberts, Sreela Sarkar, Corinna Schlombs, Andrea Stanton, Mitali Thakor, Noah Wardrip-Fruin

Defence and aerospace industries in Scotland generate nearly £2.31 billion in sales and together with the MoD support almost 50,000 jobs and a record number of apprentices. As well as a recognised expertise in naval ship building, Scotland also has a strong defence electronics industry and a strong aerospace industry based around Prestwick. This report examines the delay in the signing of the contract for two new aircraft carriers: the Committee is concerned that similar delays during the construction phase could lead to job losses and damage the ship-building skills base the UK needs to support if it wishes to retain sovereign capability in key areas. The Committee also comments on the Government's decision to treat the Military Afloat Reach and Sustainability (MARS) vessels as commercial rather than naval vessels, making them subject to EU competition law. There is confusion over the status of these vessels. The report also looks at the supply of skilled, semi-skilled and graduate workers, the Modern Apprenticeship programme, and the funding for adult apprentices. It is vital for Scottish industry to look at upskilling throughout the workforce, including mature workers who were not able to access apprenticeships as school leavers. The issue of constitutional change also

affects the future sustainability of the Scottish defence industry. In the long term it is unclear what naval requirement an independent Scotland would have and whether this would make up for the potential loss of UK MoD orders. Government and industry need to work effectively together to ensure that Scotland's engineering and manufacturing base continues to be world class.

The discovery of a Standard Specific Baseline Mass Transfer Coefficient (KLa<sub>0</sub>)<sup>20</sup> represents a revolutionary change in the understanding, designing, operation and maintenance of aeration equipment, as well as providing a baseline for future research and development for water and wastewater treatment systems. Previously, it has not been possible to correlate mass transfer coefficients (KLa) from one test to another, even under ordinary testing circumstances. This book discusses the use of the Standard Model to determine the baseline for any test, and its major finding is showing that gas transfer is a consistent relativistic theory of molecular interactions based on the Standard Model. Previously, the primary challenge was the appearance of divergences in the mass transfer coefficient calculations and estimations. This procedure of renormalization to a baseline is a great achievement in physics and engineering.

The essays in this book address the transformation of higher education and the transformative possibilities of its current conditions. Higher education in American history has always functioned within the context of larger social and political forces. Universities and colleges have provided skilled labor for the work force, scientific knowledge and innovation for manufacturing, and policy expertise for government.

Technologies such as synthetic biology, nanotechnology, artificial intelligence, and geoengineering promise to address many of our most serious problems, yet they also bring environmental and health-related risks and uncertainties. Moreover, they can come to dominate global production systems and markets with very little public input or awareness. Existing governance institutions and processes do not adequately address the risks of new technologies, nor do they give much consideration to the concerns of persons affected by them. Instead of treating technology, health, and the environment as discrete issues, Albert C. Lin argues that laws must acknowledge their fundamental relationship, anticipating both future technological developments and their potential adverse effects. Laws should encourage international cooperation and the development of common global standards, while allowing for flexibility and reassessment.

Evaluation of Digital Libraries summarizes research and practice on both sides of the Atlantic and aims to answer the potential questions that both the theoretical and practical areas of digital library evaluation have posed during recent years. The book systematically presents aspects of participating communities, reasons and aims of evaluation, methodologies and metrics, and application paradigms. The book deals with practical and theoretical issues on digital

libraries development and evaluation It will be multi-disciplinary due to its nature incorporating views and perspectives of various contributing fields Distinguished digital library researchers and practitioners present systematically methods, techniques and practices. The list of contributors include Maristella Agosti, David Bainbridge, Ann Blandford, Colleen Cook, Nicola Ferro, Brinley Franklin, Manolis Garoufallou, Sarah Giersch, Richard Hartley, Judy Jeng, Michael Khoo, Martha Kyrillidou, Yvonna Lincoln, David McArthur, Maria Monopoli, David Nicholas, Christos Papatheodorou, Terry Plum, Tefko Saracevic, Rania Siatri, Yin Leng Theng, Giannis Tsakonas and Lee Zia

This book is the first substantial study in any language of one of revolutionary Russia's most distinguished and controversial engineers - Iurii Vladimirovich Lomonosov (1876-1952). Not only does it provide an outline of his remarkable life and career, it also explores the relationship between science, technology and transport that developed in late tsarist and early Soviet Russia. Lomonosov's importance extends well beyond his scientific and engineering achievements thanks to the rich variety and public prominence of his professional and political activities. His generation - Lenin's generation - was inevitably at the forefront of Russian life from the 1910s to the 1930s, and Lomonosov took his place there as one of the country's best known and ultimately notorious engineers. As well as an innovative engineer who campaigned to enhance the role of science, he played a major role in shaping and administering the Russian railways, and undertook several diplomatic and scientific missions to the West during the early years of the Revolution. Falling from political favour during an assignment in Germany (1923-1927), he achieved notoriety in Russia as a 'non-returner' by apparently declining to return home. Thereby escaping probable arrest and execution, he began a new life abroad (1927-1952) which included a research post at the California Institute of Technology in 1929-1930, collaborative projects with the famous physicist P.L. Kapitsa in Cambridge, a long-time association with the Institution of Mechanical Engineers in London, and work for the British War Office during the Second World War. From Marxist revolutionary to American academic, this study reveals Lomonosov's extraordinary life. Drawing on a wide variety of official Russian sources, as well as Lomonosov's own diaries and memoirs, a vivid portrait of his life is presented, offering a better understanding of how science, technology and politics interacted in early-twentieth-century Russia.

The 13th International Conference on Human-Computer Interaction, HCI International 2009, was held in San Diego, California, USA, July 19-24, 2009, jointly with the Symposium on Human Interface (Japan) 2009, the 8th International Conference on Engineering Psychology and Cognitive Ergonomics, the 5th International Conference on Universal Access in Human-Computer Interaction, the Third International Conference on Virtual and Mixed Reality, the Third International Conference on Internationalization, Design and Global Development, the Third International Conference on Online Communities and Social Computing, the 5th International Conference on Augmented Cognition, the Second

International Conference on Digital Human Mod- ing, and the First International Conference on Human Centered Design. A total of 4,348 individuals from academia, research institutes, industry and gove- mental agencies from 73 countries submitted contributions, and 1,397 papers that were judged to be of high scientific quality were included in the program. These papers - dress the latest research and development efforts and highlight the human aspects of the design and use of computing systems. The papers accepted for presentation thoroughly cover the entire field of human-computer interaction, addressing major advances in knowledge and effective use of computers in a variety of application areas. At a time when scientific and technical innovation now requires a multitude of heterogeneous inputs and expertise from the public and private sectors alike, cooperative research centers (CRCs) have emerged as the predominant vehicle for cross-sector collaboration. In the U.S. alone, there are thousands of CRCs on university campuses, and agencies like the National Science Foundation, National Institutes of Health, Department of Defense, and more recently the Department of Energy fund CRCs to address some of the nation's most formidable challenges with science and technology, including cancer and other diseases, terrorism surveillance and the detection of weapons of mass destruction, and new energy technologies and smart energy grid development. Industry oftentimes participates in CRCs for access to knowledge, capacity development, and to mitigate risk. This volume includes research investigating CRCs from North America, Europe, Australia, and Asia to explore the dynamics of CRCs, including but not limited to resource allocation, structure, level of sponsorship, organization and membership, management and operations, objectives and goals, and in doing so identifies both differences and similarities across institutional and national contexts. The volume sheds light on the role of CRCs in promoting innovation, S&T policy, and economic development, and on the practical aspects of successful CRC management. Moreover, the works included in the volume consider the implications for the various stakeholder groups (firms, universities, researchers, students, policymakers) invested in CRCs.

The book is about the discovery of a Standard Specific Baseline Mass Transfer Coefficient (KLa0)<sup>20</sup> that represents a revolutionary change in the understanding, designing, and operation of aeration equipment, as well as providing a baseline for future research and development for water and wastewater treatment systems. It discusses the use of the Standard Model for oxygen transfer to determine the baseline, and its major finding is to show that the gas transfer model is a consistent relativistic theory of molecular interactions. Previously, the challenge was the appearance of divergences in the mass transfer coefficient estimations that defies aeration design. This normalization to a baseline is a great achievement in physics and engineering.

At 5:20 in the afternoon on 9/11, Building 7 of the World Trade Center collapsed, even though it had not been struck by a plane and had fires on only a few floors. The reason for its collapse was considered a mystery. In August 2008, NIST (the

National Institute of Standards and Technology) issued its report on WTC 7, declaring that "the reason for the collapse of World Trade Center 7 is no longer a mystery" and that "science is really behind what we have said." Showing that neither of these claims is true, David Ray Griffin demonstrates that NIST is guilty of the most serious types of scientific fraud: fabricating, falsifying, and ignoring evidence. He also shows that NIST's report left intact the central mystery: How could a building damaged by fire—not explosives—have come down in free fall?

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