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TRANSFORMATION, REVOLUTION, EVOLUTION: PROVOCATIVE TIMES FOR PROSTHETICS & ORTHOTICS

Silvia Ursula Raschke,
Co-Editor-In-Chief

Marshall McLuhan: "Obsolescence never meant the end of anything, it's just the beginning"

ARE WE CRAZY?

The launch of a new journal, the Canadian Prosthetics and Orthotics Journal (CPOJ), is a good time to consider the brilliance – or foolhardiness – of such a venture as well-established peer-review journals struggle to survive. The challenges faced by the traditional, print based, peer-review publishing model are rooted in a greater wave of rapid disruptive change influencing technology innovation models and economic models in a wide range of sectors, including health care across the clinical care delivery continuum.

How will this change influence prosthetics and orthotics and what does it mean for the future? These are important questions to consider, as CPOJ charts a course aiming to respond to these trends in a positive, sustainable way while adhering to high professional and academic standards. Finding answers starts with a short reflection on the causes of this change: the threads weaving the fabric of the Fourth Industrial Revolution.

THE FOURTH INDUSTRIAL REVOLUTION

With its origins in the mid last century, the Fourth Industrial Revolution is now well and truly upon us. Characterized by the convergence of the *digital, physical* and *biological* domains, fresh approaches and markets are being created at intersections between two or all three of these domains.[1] The space occupied by prosthetics and orthotics is not being spared. This most recent industrial revolution is being built on a foundation of vast databases that are created, managed and mined using newly developed data collection, machine learning and communication tools. Lord Kelvin (1824-1907) said: "If you can not measure it, you can not improve it." With the vast number of data driven tools now available the ability to improve and transform, across all sectors and fields, has become substantial and within reach. Ready or not – change is coming. Early examples of this revolution's effects can be found in manufacturing (digital supply chains, robotics), commerce (web-based business models, block chain) and communication (changing models of journalism, social media). Academic research is also evolving, as the traditional peer review model is no longer the sole method for driving scientific knowledge development and dissemination. In prosthetics and orthotics, the first innovation cycle includes 3D printed prosthetic legs and customized foot orthotics incorporated into web-based business models. Future directions will likely include smart prostheses and orthoses and mass customized devices.

At the broadest level of science and discovery, the spirit of the Fourth Industrial Revolution demystifies and democratizes knowledge, engaging and empowering non-traditional participants who are not afraid to challenge the status quo. (e.g. Citizen Science and Maker Movements).[2,3] Time honoured models of knowledge transfer, primarily via journals and conferences, are being supplemented by engaging, accessible models such as Ted Talks,[4] which reach vast, international audiences in seconds.

More creative, flexible formats and portals for peer-review level research, such as open access models, video journals and publication of research protocols without results are emerging, but in future will only be one part of a massive knowledge stream within what has become a very wide and colourful information pipeline. Emerging from the pipeline are a new class of thought leaders who challenge the traditional 'expert model' where academics and professionals worked their way up an established hierarchy or credentialing process. The days of the unchallenged 'expert' are gone.[5] Modalities such as social media, the internet and personal monitoring and

communication devices allow a wide range of solution providers from anywhere to have direct access to those seeking solutions without necessarily engaging members of the traditional hierarchy.

THE WINDS OF CHANGE

Canadian visionary Marshall McLuhan said "Obsolescence never meant the end of anything, it's just the beginning". This axiom is taken for granted by those who embrace change, typically in data driven sectors such a business or engineering. These sectors tend to be early adopters of new ideas and technology while sectors such as health care traditionally lag behind in with the adoption of new technology and processes.[6] Whichever approach taken, enthusiastic early adopter or reluctant laggard, the innovation life cycle does not stop and is accelerating at a faster pace than seen in the previous industrial revolutions.[7] This paradigm shift is rapidly changing the terrain in all sectors, at the technical, societal and policy levels.

Interestingly, a very commonly cited example of the positive effects the Fourth Industrial Revolution will have on society is the prosthetics and orthotics sector. Prosthetic and orthotic examples provide a real, highly visual, easy to understand example of innovation potential at the convergence of the *digital, physical* and *biological* realms, alongside a compelling story of the power to radically transform and improve on existing approaches – *more efficiently and at a lower cost.* While the focus in the Fourth Industrial Revolution is innovative technology, it must not be overlooked that all of this is predicated on the ability to provide more for less. Whatever the grand vision presented, the primary drivers are increasingly fiscal and can never be discounted or overlooked.

CPOJ'S GOAL

In the spirit of the Fourth Industrial Revolution, the Canadian Prosthetics and Orthotics Journal will strive to be an interdisciplinary, multi-modal information hub linking the digital, physical and biological realms as they relate to prosthetics and orthotics. CPOJ is committed to providing free open access to high quality papers, reviewed by an interdisciplinary editorial board that includes persons from the clinical practice of prosthetics and orthotics.

In addition, CPOJ aims to provide good quality information across the information pipeline, by also providing portals for technical papers, case studies, theses, poster presentations and videos in the open access format.

The goal is to support innovation and the advancement of the state of practice prosthetics and orthotics by all persons committed to making positive contributions and providing the best outcomes for our constituent communities.

The pessimist complains about the wind; the optimist expects it to change; the realist adjusts the sails.
William Arthur Ward (1921-1994)

As Co-editor in Chief, I wish you happy and challenging reading.

Silvia Ursula Raschke, PhD

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SHORT SCIENTIFIC BIOGRAPHY

Dr. Silvia Raschke has a PhD in Prosthetics and Orthotics from Strathclyde University's Faculty of Engineering (1997). Dr. Raschke is a research faculty member at the British Columbia Institute of Technology. Her research gives voice to the end users of products, processes or policies to ensure that the communities she works with are represented and have their needs met. She does this by employing evidence based practices to explore and organize how people in the community are impacted by product design, standards of practice (or lack thereof) and policy impact those people so that product design, process design and policy development is practical, implementable and actually support those who have to make things happen on the front line, on the shop floor or in their homes. Her two areas of specialty are rehabilitation engineering with a focus on prosthetic and orthotic design in support the clinicians and patients and first responders with a focus on police and the police dog service. Dr. Raschke serves on a variety of professional and educational committees and is a Board Member and past Vice President of the BCIT Faculty and Staff Association, in addition to being a member of the BCIT Emergency Response Team. She is the Principle Investigator for the Centre for Rehabilitation Engineering and Technology that Enables (CREATE). CREATE is a collaborative venture between BCIT and the Neil Squire Foundation that was funded by the Canadian Foundation for Innovation and the B.C. Knowledge Development Fund (2001).