

University of Toronto Centre for the Study of Pain

External Review Report

2008

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University of Toronto Centre for the Study of Pain External Review Report – September 2008

Executive Summary

In completing my second, and final, term as Director of the University of Toronto Centre for the Study of Pain (UTCSP), I am pleased to submit this Report which reviews the history, original goals and accomplishments, and summarizes our main objectives for the next five years. The UTCSP has achieved its main goals through building a coordinated network of University of Toronto research and educational programs in pain and we have developed a series of novel strategic interdisciplinary initiatives in pain research and education.

The UTCSP began as a concept for a comprehensive and coordinated network of research and education on pain at the University of Toronto and was established in 1999 through base-budget and faculty salary funding awarded from a successful application to the Academic Priorities Fund competition. As a consequence of the University's investment in the UTCSP, the recruitment and retention of pioneering researchers and academics in the area of pain and the development of new rising stars, the University of Toronto is now well-known as a globally leading centre of excellence and leadership in pain research and education. A collaborative partnering of the Faculties of Dentistry, Medicine, Nursing and Pharmacy, the UTCSP is home to a unique and innovative community of pain scientists, dedicated to excellence in research and scholarship as well as the rapid and seamless translation of new knowledge on pain into educational programs for both health researchers and practitioners.

The UTCSP's interdisciplinary team of basic and clinician scientists is internationally recognized for breakthrough discoveries and novel approaches to interdisciplinary education in pain. Many UTCSP members are actively involved in patient care and clinical education through the Centre's participating Faculties and affiliated teaching hospitals, and serve to reinforce the team's shared commitment to closing the gap between research evidence and pain management practices at the clinical level. In bridging research activities to a coordinated array of interdisciplinary educational programs, the UTCSP strives to ensure that new ideas, therapies and evidence-based strategies for alleviating pain continue to be developed, disseminated and clinically applied, today and well into the future.

Pain researchers at the University of Toronto have a long history of pioneering research on the mechanisms, assessment and management of pain across the lifespan. Amongst our most significant discoveries are breakthroughs in the understanding of craniofacial, surgical and paediatric pain, the genetic mechanisms that modulate pain, the cellular and molecular mechanisms that mediate acute and chronic pain, and evaluation of knowledge translation strategies to ensure effective translation of pain-relieving interventions into clinical practice. The research findings of UTCSP researchers regularly appear in elite journals including *Nature*, *Science*, *Cell*, *Pain*, *New England Journal of Medicine*, *Nursing Research*, *JAMA* and *Lancet*. In balancing basic and clinical science research, the UTCSP is intent on promoting translational advancements in pain that have a meaningful impact for a wide array of stakeholders including clinicians, educators, administrators, patients, families and policy makers.

The excellence of UTCSP researchers has been recognized by numerous national and international research awards. For example, UTCSP researchers have won more Early and Distinguished Career Awards from the Canadian Pain Society than any other university in the country. Our researchers hold seven Canada Research Chairs, the Michael Smith Chair in Neurosciences and Mental Health, an International Research Scholar Award from the Howard Hughes Medical Institute, to name just a few. UTCSP members have had leadership roles on major national and international organizations such as President of the International Association for the Study of Pain, and have served as members of advisory boards for several CIHR Institutes.

UTCSP researchers not only hold individual research grant support for many agencies including the Canadian Institutes of Health Research (CIHR), the NIH (USA), and the Wellcome Trust (UK) but are leaders of major team research grants. The most recent of these team grants are *Transforming Research in Neuropathic Pain* from Neuroscience Canada (\$2M), *Team Grant in Child Pain: Translating Research on Pain in Children (TROPIC)* from CIHR (\$5.4M) and two New Emerging Team (NET) grants from CIHR on gender differences in pain in children (\$1.5M) and on pain and fatigue in osteoarthritis (\$2.1M). The UTCSP is a critical catalyst for the development of team grants in support of interdisciplinary, national and international research on pain.

The Interfaculty Pain Curriculum (IPC), the UTCSP's flagship educational program, enables undergraduate health science students to develop skills and knowledge in the assessment and management of pain through a dynamic interdisciplinary learning experience. Every spring, over 850 University of Toronto students from the pre-licensure programs in nursing, dentistry, medicine, pharmacy, occupational therapy, and physical therapy participate in this required 20-hour integrated curriculum on pain. Supported by lectures and panel discussions, the program centres on a series of interprofessional small group sessions in which participants, guided by a team of more than 80 clinician and academic facilitators, collaborate to develop comprehensive interdisciplinary management plans for standardized patients. The IPC is the only program of its kind in the world and garners strong support from students for both its high-level instruction on pain and the opportunity it provides for interprofessional interaction and growth. The IPC is not only an educational event but also a research platform for studies on advancing understanding of the process and effectiveness of educating diverse groups of health care professionals. The research component of the IPC has resulted in a number of presentations at national and international meetings, and two research publications in the journal *Pain*. As further evidence of the impact of the IPC, it received the highly-competitive Northrop Frye Award, recognizing distinguished achievements in linking teaching and research, from the University of Toronto in 2007.

The UTCSP sponsors numerous conferences, lectures and seminars on pain research. The premiere annual event, the UTCSP Pain Day, is a multidisciplinary retreat that engages trainees, researchers, principal investigators and clinicians in an interactive symposium on the latest advances in pain science in a particular content/ life span/ gender area (e.g. pain in children, the elderly, women). In addition to offering trainees, at all levels and from a broad range of interest, an opportunity to expand their understanding of current topics on pain, this event serves to promote an informative dialogue amongst leading clinical, research, educational, administrative

and patient stakeholders in the pain research community.

The UTCSP's principal programs in research training involve its Clinician Scientist Trainee Award and the Purdue Pharma Ontario Graduate Scholarship in Science and Technology (OGSST) Award. The UTCSP and the leadership of its researchers have been critical for the development, success and support of three Strategic Training in Health Research (STIHR) Programs funded by CIHR; (1) *Pain: Molecules to Community (PainM2C)* and (2) *CellSignals* are led by researchers at University of Toronto. (3) *Pain in Child Health (PICH)* is co-lead by a UTCSP member and supports research training in pediatric pain and development. Supporting new and innovative individual scientists or interdisciplinary teams of investigators, these STIHR programs are devoted to educating the next generation of pain researchers and increasing research capacity in key areas, such as clinical pain management within the context of a collaborative multidisciplinary environment.

Over the next five years, our main goals will be to build on our successes in research and education and to develop initiatives that will accelerate the pace of translating our discoveries on pain into improved pain assessment and management and clinical outcomes (e.g. decreased pain intensity and increased quality of life and patient satisfaction). In research, the UTCSP will expand its critical role of catalyzing basic and clinical science research, and the building of research teams on pain. At the interface of research and education, the UTCSP will be a vital and necessary partner for the successful renewal of the CIHR STIHR programs on pain, the process of renewal which is now underway. In education, the IPC will serve as the pinnacle of pain training for pre-licensure health professionals at the University of Toronto. The IPC will also act as a template for developing post-licensure training and related research of health professionals in our local and national communities, emphasizing effective pain management as a key component of all health care delivery. An overarching theme of the UTCSP over the coming years will be to build further linkages between basic scientists, clinician scientists and clinicians all of whom are devoted to solving the problem of pain.

University of Toronto Centre for the Study of Pain External Review Report – July 2008

I. Introduction

The past nine years have been a time for extraordinary growth and development for the University of Toronto Centre for the Study of Pain (UTCSP). Established in 1999 as a dream of a small group of dedicated pain researchers to enhance the study of pain at the University of Toronto, the UTCSP has blossomed into a focal point for developing integrated multidisciplinary approaches to education and pain research. It provides a “home base” for the community of pain researchers and practitioners in the Faculties of Dentistry, Medicine, Nursing and Pharmacy at the University of Toronto to come together as a model of cohesive, interdisciplinary and interprofessional collaboration in research, dissemination of knowledge and scholarship about pain.

This Report reviews the accomplishments of the UTCSP from 1999-2008. The UTCSP is now well established. Its goals going forward, as outlined in this Report, will further serve to promote leadership both nationally and internationally in pain research and education. Association with the UTCSP since its inception has been extremely exciting; the future for the UTCSP will be equally exciting, as future potential is maximized.

Pain is gaining prominence as a topic of research in biomedical and clinical sciences, and is attracting considerable public awareness as an enormous unsolved problem affecting hundreds of millions of individuals of all ages worldwide. Many UTCSP members are taking leading international roles in basic and clinical research, and in pain education. In research, UTCSP members are at the forefront of the revolution underway in the understanding of acute and chronic pain. In public outreach and educational endeavours, our members are key leaders in translating the ever-growing body of knowledge gained from pain research into clinical practice.

II. Who are we?

The UTCSP was formally established in 1999 by the Faculties of Dentistry, Medicine and Nursing, which applied jointly to the Provost’s Academic Priorities Fund (APF) to create a Centre of Excellence and Leadership in Pain Research and Education. These Faculties were joined by the Faculty of Pharmacy in 2001.

The initial main goals of the UTCSP were: i) to build a coordinated network of University of Toronto educational and research programs in pain and ii) to develop novel strategic interdisciplinary initiatives in pain research and education. Our mission is to lead in research, educational and clinical activities concerning pain; to be a model of interdisciplinary collaboration in the creation and dissemination of knowledge about pain and to promote excellence in scholarship.

The UTCSP is a virtual centre, with an administrative office in the Faculty of Dentistry and a network of members across campus and in five of the University of Toronto-affiliated

teaching hospitals. The UTCSP organization consists of four main committees (see also Appendix 1):

- the Advisory Committee provides guidance to the UTCSP Director;
- the Education Committee plans and implements interfaculty educational activities, and coordinates educational events within the various Faculties;
- the Research Committee coordinates interfaculty research initiatives and events, and adjudicates the research awards made by the UTCSP;
- the Membership Committee assesses applications for membership in the UTCSP.

The Director of the UTCSP since its inception has been Dr. Michael Salter. He has served two terms 1999-2002 and 2002-2007, with an extension through 2008. The Advisory, Education and Research Committees are comprised of prominent pain researchers and educators from each of the four participating Faculties.

The membership of the UTCSP has grown from our initial 40 members to our present membership of 66 regular members, 14 trainee members, 110 facilitators and 5 affiliate members; a group of 190 individuals covering diverse research, educational and clinical areas in the University of Toronto and its affiliated hospitals and hospital-based research institutes. The membership includes faculty members, trainees and a cadre of facilitators who are critical to the success of the Interprofessional Pain Curriculum. We have affiliate members from the private sector and from The University of Western Ontario and Queens' University. A complete listing of all committees and members can be found in Appendix 2 and on the UTCSP website www.utoronto.ca/pain/.

From the original APF funding, the UTCSP receives \$49,000 per annum in base funding, plus \$50,000 which goes specifically toward the UTCSP Clinician Scientist Trainee Award. In addition, each of the four UTCSP member Faculties involved in the Centre contributes \$9,000 per annum toward the UTCSP operating budget. From a successful application to the Provost's Academic Initiatives Fund (AIF) in 2005, the UTCSP receives an amount of \$50,000 per annum in base budget towards the support of the Interfaculty Pain Curriculum (IPC). Salary lines of the original UTCSP APF, together with funding from the Canada Research Chairs program is used to provide salary and operating fund support to Professors Ze'ev Seltzer and Min Zhuo who were recruited as new faculty members (see also below). In addition, the UTCSP has garnered a funding allotment from the original APF of \$250,000 per annum. The UTCSP has remained within its budget target for each fiscal year that it has been operational.

III. Major Achievements during our first nine years

The UTCSP was funded in June 1999 and officially launched in February 2000. A celebratory introduction of the UTCSP was held during the 9th World Pain Congress in Vienna, Austria in 1999 to take advantage of this world stage to introduce to the international scientific community this unique initiative of the University of Toronto. The UTCSP has accomplished much in the first nine years. The following is an overview of our research, educational, communications, recruitment and national/international activities.

Research

Conducting and facilitating world-leading research on pain at the University of Toronto is one of the main goals of the UTCSP. By developing an excellent and interactive research environment, supporting trainees and funding seed projects, the UTCSP has facilitated research on pain and importantly has been a key force in the retention and recruitment of outstanding pain researchers in at the University of Toronto. Members of the UTCSP are amongst the world's leaders in research on pain, and are regularly making breakthrough discoveries on pain and analgesia. Papers reporting the results of the research of UTCSP members over the past nine years have appeared in the most prestigious multidisciplinary journals *Nature* and *Science*, and in the top journals in the disciplines represented by the UTCSP including *Pain*, *Cell*, *Nature Neuroscience*, *Journal of the American Medical Association*, *Neurology*, *Nursing Research* and *The New England Journal of Medicine* (eg. see Appendix 3). The 20 most active researchers of the UTCSP currently hold total peer-reviewed annual research funding of more than \$21M, a marked increase from \$4.4M in 1999, prior to the start of the UTCSP. Research funding to UTCSP members comes from a variety of sources including: *local* – hospital-based research institutes; *provincial* – Ontario Mental Health Foundation, Ontario Neurotrauma Foundation; *national* – the Canadian Institutes of Health Research (CIHR), the Canadian Arthritis Network (CAN), the National Cancer Institute (NCIC), Canadian Foundation for Innovation (CFI); *international* – the National Institutes of Health (NIH, USA), the Howard Hughes Medical Institute (HHMI, USA), the Mayday Fund (USA). Commensurate with the increase in research funding since establishing the UTCSP, research publications by these UTCSP members have increased to a total 162 in 2007 as compared with 90 in 1999.

As further evidence of prominence in research, many members of the UTCSP hold leadership positions in the International Association for the Study of Pain (IASP), the foremost pain research organization in the world. The IASP has 7,000 members worldwide, involving all professional and health disciplines dealing with every aspect of pain. Dr. Barry Sessle served as President of the IASP (2002-2005). Dr. Patricia McGrath is a member of the IASP Council and was recently elected IASP Secretary. Drs. McGrath, Jonathan Dostrovsky, Joel Katz and Michael Salter are Associate Editors of the IASP's journal *Pain*. Also, Dr. Karen Davis is a Section Editor of *Pain*. In addition, Drs. Dostrovsky and Watt-Watson were members of the Scientific Program committee for the 11th IASP World Congress in Sydney, Australia in 2005, Dr. Watt-Watson was on the Scientific Program Committee for the 12th World Congress in Glasgow 2008 and Dr. Bonnie Stevens is on the Scientific Program Committee for the 13th World Congress in 2010 in Montreal. Dr. Watt-Watson is a member of the IASP Education Committee and a previous member of the IASP Ethics Committee. Members of the UTCSP regularly serve on Task Forces of the IASP.

Pain Research Teams through the UTCSP. Prior to the establishment of the UTCSP, there were no team, group or training grants on pain at the University of Toronto or any of the affiliated hospital-based research institutes. One of our main objectives has been to act as a catalyst for multi-investigator team funding through developing the research environment and interactions that promote collaboration, disseminating information about funding opportunities and aiding in completing funding applications. To this end, UTCSP members have developed several major team research grants on pain and participate in others,

described in this section, and lead team training grants (described below).

The UTCSP has created a dynamic research environment through our activities and the recruitment of outstanding researchers and trainees, which has led to the retention of key leaders in pain research. Through the vision and leadership of these individuals, a growing series of research teams focused on pain has developed as a consequence of the UTCSP. One of these Pain Teams is *Transforming Research in Neuropathic Pain* (Leader: Dr. Michael Salter; UTCSP members: Drs. Karen Davis, Min Zhuo; non-UTCSP members: Drs. Yves DeKoninck, U. Laval, and Jeffrey Mogil, McGill U. Total funding \$2M). This team is one of only three teams funded by Neuroscience Canada and the only one of these teams to receive extension of its funding.

Another major multi-investigator team on pain is the *CIHR Team in Pain in Children* (Team Leader: Dr. Bonnie Stevens; UTCSP members: Drs. Jennifer Stinson, Janet Yamada, Fiona Campbell, Anna Taddio, non-UTCSP members from eight Canadian universities/ Paediatric Health Care Centres; total funding \$5.4). A third team on pain led by a UTCSP member is the CIHR-funded *Net Emerging Team (NET) on Gender differences in child development: vulnerability to chronic pain* led by Dr. Patricia McGrath (\$1.5M). A fourth pain team led by a member of the UTCSP is a CIHR *NET on Determinants and Consequences of Pain and Fatigue in Osteoarthritis (OA) using a Biopsychosocial Approach* headed by Dr. Gillian Hawker as PI and Dr. Allan Gordon as co-investigator. Together with a companion operating grant funding is approximately \$2.1M.

UTCSP members also have major leadership roles on six other pain research teams. One is the recently funded CIHR *Community Alliances for Health Research and Knowledge Translation on Pain* grant (\$2.5M, PI Dr. James Henry, McMaster U.), one of only two such knowledge translation grants funded. Team leaders on the E-learning in interprofessional pain education theme of this grant are Drs. Judy Watt-Watson, Michael McGillion, Judith Hunter and Leila Lax. A second theme of this grant, on Preceptorship Programs in Pain Management, is headed by Dr. Allan Gordon and includes Dr. Phillip Peng. It will assess the effectiveness of knowledge translation in pain management in young physicians. The second team is the CFI-funded *Canadian Pain Trials Network* (\$1.9M, PI Dr. Mary Lynch, Dalhousie U.) with UTCSP members Drs. Allan Gordon, Bonnie Stevens and Judy Watt-Watson as co-investigators. The third team is the *Neuropathic Pain Clinical Database* (\$2M, PI Dr. Dwight Moulin, Univ. Western Ontario) which is being supported by Pfizer Canada and involves clinicians in at pain clinics across Ontario including London Ontario, Toronto and Ottawa, and also in Montreal. The main UTCSP PI is Dr. Allan Gordon, and Dr. Ze'ev Seltzer has recently been recruited to coordinate collection and analysis of human genetic data in the *Neuropathic Pain Database*. The fourth team *Risk Factors In The Transition Of Acute To Chronic Pain After Cardiac Surgery – The CARDPAIN Project* is a multi-site CIHR grant with PI Dr. Judy Watt-Watson, C0-PI Dr. Manon Choiniere University of Montreal and includes co-investigators Drs. Christopher Feindel and Judy Costello University Health Network (\$625K). The fifth team *Improving Chronic Pain Management in Canada – The STOP-PAIN Project* is a multi-site CIHR –Industry grant with Dr. Manon Choiniere of University of Montreal as PI and Dr. Phillip Peng of Toronto as Co-PI (\$400K). Lastly, *COMPASS Study: Cannabis for the management of pain: assessment of safety study*

with Drs. Jean-Paul Collet and Mark Ware as PIs, features 6 sites in Canada with A. Gordon as one of three co-investigators. It is Health Canada funded and CIHR-approved (\$1.6M).

Recognition of Pain Research Excellence. The excellence of UTCSP researchers has been recognized by numerous national and international research awards (Appendix 4). UTCSP researchers have won four Early Career Awards, five Distinguished Career Awards and four Nursing Research Awards from the Canadian Pain Society, more in total than any other university in the country. Our researchers hold seven Canada Research Chairs (see below), the EJLB-CIHR Michael Smith Chair in Neurosciences and Mental Health, two Mayday Society Fellowships, and an International Research Scholar Award from the Howard Hughes Medical Institute.

Biotechnology Spinoff Companies. Discoveries from UTCSP members have formed the basis for several new biotechnology companies each of which is aiming to develop new pharmacological agents for the treatment of chronic pain. *NoNO Inc.* (Dr. Michael Salter, co-founder) is in pre-clinical development of molecules that suppress pathologically enhanced function of NMDA receptors in chronic pain models. *Neuropharm Inc.* (Dr. Min Zhuo, founder) is in pre-clinical development of adenylyl cyclase inhibitors for pain. *Chlorion Pharma*, in Quebec City, is developing discoveries made from Drs. Michael Salter and Yves De Koninck on aberrant upregulation of intracellular Cl^- in neuropathic pain models.

The **Research Committee**, chaired by Dr. Dostrovsky, guides the UTCSP in achieving our goals in research beyond the level of the research programs of the individual members. The Research Committee promotes pain research and translation of this research through various seminars, symposia and the annual UTCSP Pain Day which involve trainees, and clinician and basic scientists. In addition, we are promoting research through various funding mechanisms including the CRC and CFI programs. Briefly, our activities to promote collaborative research and research translation over the past nine years include:

Canada Research Chairs - Pain identified a priority area in Strategic Research Plan of University of Toronto. Through the Strategic planning exercise done for the Canada Research Chair (CRC) Program, pain was identified as a research “cluster” and has become a flagship program of the University. A “pain cluster” working group (including Drs. Sessle, Salter, Stevens) produced a working paper justifying the cluster, ultimately resulting in the assignment of four CRCs to the Pain cluster. The stewardship of and strategic planning for the Pain Cluster were assigned to the Director of the UTCSP. Through the cluster, we made two successful applications for Tier I CRCs - Drs. Barry Sessle and Ze’ev Seltzer. Each of these CRC awards was made together with an award for infrastructure funding from CFI. The Faculty of Medicine did not assign CRCs on the basis of “clusters”, nevertheless pain is recognized as a priority area and UTCSP members Drs. Claire Bombardier, Alex Jadad, Michael Salter and Min Zhuo hold Tier I CRCs through the Faculty of Medicine and affiliated teaching hospitals, and Dr. Karen Davis holds a Tier II CRC.

Salary support awards for trainees for pain research. Prior to establishing the UTCSP, there was no support dedicated to pain trainees from the University of Toronto. As part of

the APF allocation, base-budget support of \$50,000 per year was provided for Clinician-Scientist trainee awards. The University's commitment to this funding was instrumental in leveraging additional funding from industry to support training of graduate students. To supplement the base-budget funding, we have secured support for a graduate salary award, which was made possible through raising funds from Purdue Pharma which donated \$50,000 that was matched by the Ontario Graduate Scholarship in Science and Technology (OGSST) program, administered through the Faculty of Medicine. These awards from the UTCSP are made on an annual basis through a competitive process adjudicated by the Research Committee. The supported trainees are from a variety of disciplines and selected on the basis of an innovative research project under the supervision of a faculty member of the UTCSP, high academic standing, research productivity and future research potential. The research done by the trainees supported by the UTCSP has consistently been novel and significant leading to major publications in leading peer-reviewed journals.

We have used the funding from the Clinician-Scientist and Purdue Pharma awards as matching funds for external trainee salary support programs, and in particular for the STIHR programs on pain (see below). In this way, we have leveraged support for trainees and increased the number of trainees that could be supported beyond that which would be possible otherwise. Thus, during our first nine years, we have supported fourteen trainees as UTCSP Clinician-Scientist Fellows (for a total of \$450,000 invested by the UTCSP) across the participating Faculties. All of the UTCSP Clinician-Scientist trainees have pursued post-doctoral training upon completion of their research training. Three of these now hold faculty positions in the University of Toronto – Andrea Furlan, Medicine; Elyse Levinsky, Medicine; Michael McGillion, Nursing. There have been nine recipients from the Faculty of Medicine of the Purdue Pharma OGSST for a total of \$135,000. A complete listing of the recipients of the Clinician-Scientist and Purdue Pharma awards, and their present positions can be found in Appendix 5.

UTCSP Retreat - "Pain Day" and UTCSP-sponsored events. The annual scientific retreat brings together trainees and PI researchers as well as clinicians for a day-long symposium devoted to the latest advances in pain research. A highlight of the Retreat is a presentation from one or two invited keynote speakers from around the world on their latest research discoveries. The Retreat serves as a forum for trainees at all levels and from a broad range of interests to present their work and to expand their understanding of pain research and management. In addition to the retreat we have sponsored seminars by national and international speakers, and have contributed to scientific meetings of relevance to the research done by UTCSP members. A complete listing of all UTCSP-sponsored research seminars, symposia and the UTCSP Pain Day programs can be found in Appendix 6.

UTCSPAstraZeneca Seed Grant Competition. In December 2003, the UTCSP received a donation of \$50,000 from AstraZeneca Canada Inc. to support research of the members. The Advisory Committee supported the use of these funds for development of seed research for UTCSP members. Funding was allocated through a competitive process open to all UTCSP members. A total of four awards were provided across the participating Faculties.

MUPPUT. The Multi-Professional Pain Group at the University of Toronto (MUPPUT) pre-

dated the start of the UTCSP evolving from the Pain-Interested Group in the 1980s. MUPPUT continued through 2006 as a bi-monthly research and educational forum which brings together researchers and clinicians to discuss and debate important topics about pain. Subsequently, the functions of MUPPUT have been incorporated into the UTCSP Pain Day, National Pain Awareness Week seminars and activities, seminars given by international scientists visiting various University of Toronto Faculties, and regular seminars and rounds on pain at University-affiliated hospital sites involving UTCSP members.

Education

The UTCSP **Education Committee** is charged with building a coordinated network of educational programs in pain to enhance the education of future generations of health professionals and of researchers.

UTCSP Interfaculty Pain Curriculum (IPC). Under the outstanding leadership and the insightful vision of Dr. Judy Watt-Watson, the Education Committee has developed the interprofessional education curriculum on pain to address the continuing gap between pain research and inadequate pain management practices. The Committee conceptualized, planned, and, in March 2002, implemented the first UTCSP Interfaculty Educational Opportunity in Pain – formerly referred to as “Pain Week” – an unprecedented educational event in which pre-licensure students from six professional programs (Nursing, Dentistry, Medicine, Pharmacy, Occupational Therapy and Physical Therapy) participated together for a week entirely devoted to education on pain. In making this educational program a reality, the Education Committee overcame numerous philosophical, logistical and practical hurdles in each Faculty. Beginning with 15 faculty and several student members and 63 interprofessional clinician facilitators, the Pain Curriculum now involves over 40 faculty members either as IPC committee members and/or as one of the 83 interprofessional facilitators (2008). Since its beginning, student numbers have increased from 540 in March 2002 to 860 in March 2008 reflecting the increase in Faculty enrolments.

Embedded into the design of the pain education curriculum are detailed analyses and feedback by students, facilitators and faculty members. Based on the feedback and analyses, enhanced versions of the curriculum – now referred to as the “Interfaculty Pain Curriculum” (IPC) – were successfully implemented in March 2003 (Chairs: J. Hunter, P. Pennefather) and March 2004 (Chair: J. Hunter). The IPC has continued to use this iterative approach to continually improve the content and delivery of the curriculum. The IPC includes education on pain mechanisms and management to provide a broad base applicable to all professional disciplines, as well as discipline-specific modules to facilitate collaborative discourse. A more detailed description of the IPC and the student manual is included in Appendix 7.

Outcome evaluations of this curriculum include pre- and post-tests of knowledge and beliefs and evaluation of the content and implementation process. Students’ knowledge about pain assessment and knowledge increased significantly between the pre-test and post-test in each year from 2002 to 2008, indicating successful translation of knowledge to the students. Moreover, 85%-95% of students agreed or strongly agreed that the curriculum was relevant and informative. In contrast to the depth of pain education provided by the UTCSP-IPC, pain education in the rest of Canada is insufficient according to a survey supported by the

Canadian Pain Society of more than 40 health professional teaching programs. UTCSP members have taken a leadership role to try to rectify this situation through symposia at CPS meetings, providing advice for other universities wanting to use the IPC model, and obtaining funding as part of an CIHR-CAHR team grant to develop novel web-based simulation patient cases that can be used with pre-licensure health science students in Canadian Universities.

Because no pain education model like the IPC was found in the literature, the evaluation of outcomes has been developed into research projects. All research evaluation methods have received approval yearly from the UofT Research Ethics Board. Two PhD students (Leila Lax and Rosemary Waterston) from the UT/Ontario Institute for Studies in Education conducted their PhD studies on evaluating components of the Interfaculty Pain Curriculum. These data have been presented by the Curriculum Committee investigators and the PhD students involved in peer-reviewed scientific forums both nationally and internationally, and findings have been published in two peer-reviewed papers in the journal *Pain* (see Appendix 8). Thus, this curriculum for pre-licensure students as well as the facilitator development program (see below) is a living laboratory to develop and validate teaching strategies and outcome measures for this unique curriculum.

In addition to delivering critical content to the students, this program has spawned a number of academic initiatives and research projects. For example, in the Faculty of Medicine the IPC has stimulated a year III palliative care lecture on pain, a year IV lecture on pain by Anaesthesia, and a year IV Surgical Clerk seminar on Pain and Palliative Care for all surgical clerks, thus creating a critical mass of pain education. This process is being evaluated in a CIHR funded grant in Knowledge Transfer on Pain (CAHR grant)

The UTCSP-IPC program is our flagship educational initiative. It is the first time, to our knowledge, that pre-licensure health professionals representing such diverse disciplines have learned together a substantive mandatory curriculum at the University of Toronto, or anywhere else in the world. The importance of the IPC has been recognized through the University of Toronto Northrop Frye Award in 2007, an award given in tribute to the excellence of Prof. Frye in teaching and research. More recently, Dr. Judy Watt-Watson was awarded the first Excellence in Interprofessional Education Award of the Canadian Pain Society in 2008, in recognition of her leadership and achievement with the UTCSP-IPC program. Thus, overall the IPC is gaining recognition nationally and internationally as a program that is transforming pain education. The IPC director increasingly receives requests to help to implement this program at other universities in Canada, the USA and abroad.

CIHR Strategic Training Program Grants on Pain. Only three training grants focused on pain were funded under the CIHR-wide Strategic Training in Health Research (STIHR) Grants Competitions, held in 2002 and 2003, and the UTCSP is heavily involved in each of these. Two of the Programs are led by faculty members from the University of Toronto – Dr. Michael Salter (*Pain: Molecules to Community; PainM2C*) and Dr. Richard Ellen (*CellSignals – Mucosal Inflammation and Pain*), and the third is co-led by Dr. Bonnie Stevens (*Pain in Child Health; PICH*). The UTCSP provided in-kind support for the development of the proposals and for ongoing activities of these training grants, support that

was a critical element in the success of these applications. The UTCSP provides on-going administrative support also for *Pain: Molecules to Community* through the Faculty of Dentistry. Many members of the UTCSP are co-investigators in each of these three training programs, the total funding of which is \$6M (see Appendix 9).

Each of these STIHR programs support new and innovative interdisciplinary groups of investigators training the next generation of researchers and increasing research capacity in key areas such as pain management. These programs involve networks of mentors at multiple universities Canada (*PainM2C* – 6; *PICH* – 5; *CellSignals* – 5), and internationally in the case of *CellSignals*, the trainees have regular formal and informal interactions not only with local supervisors but also with diverse research groups. That is to say, UTCSP graduate students and post-doctoral/post-professional fellows in the STIHR programs have formalized exchanges with investigators and trainees across Canada, and internationally. An unanticipated benefit of the STIHR programs is that the trainee exchanges and interactions between universities have led to the development of new research projects, novel interdisciplinary concepts, and to acceleration of research progress and translation activities. Thus, while designed as training programs, the STIHRs on pain have given additional benefits to take research in unexpected directions, and thereby serve as a critical interface between education and research.

These STIHR programs on pain have supported the training of more than 50 students and post-doctoral fellows at the University of Toronto alone, with 5 now in faculty positions. In Toronto two new faculty members (Dr. Simon Beggs, Dr. Rebecca Pillai Ridell) received training through at least one of the CIHR STIHRs on pain; we also have seeded faculty members and researchers at other leading institutions. Thus, the UTCSP has taken major steps in the education and development of future health professionals and health researchers.

Pain Management Trainees - The UTCSP provides a close association with the academic pain management centre programs located in the University of Toronto-affiliated hospitals. Year 4 students in undergraduate medicine are able to enjoy a pain elective based for instance at the Wasser Pain Management Centre at Mount Sinai Hospital yet spend part of their rotation on the Acute Pain Service at Mount Sinai or Toronto Western Hospital (TWH), the pediatric pain clinic at the Hospital for Sick Children, the Cancer Pain Clinic at Princess Margaret Hospital, and intervention clinics at TWH or Sunnybrook. The association of the UTCSP and the hospitals has also allowed the education of a number of national and international postgraduate trainees who are now practicing pain management in their home countries or other settings. The first trainee was Dr. Pat Morley Forster of London, Ontario, who subsequently assumed the Earl Russell Chair in Pain Research at the University of Western Ontario. With the hub at the Wasser Pain Management Centre at Mount Sinai Hospital, and involving the University Health Network, Sunnybrook Health Sciences Centre and the Hospital for Sick Children in the 6 years of this program the following international trainees have been educated: Dr. Mark Clark (USA), Dr. Anuj Bhatia (United Kingdom), Dr. Ammar Gilani (Pakistan/USA, now at McMaster University in Hamilton Ontario), Dr. M. Lynch (Ireland), Dr. Sujith Dandina (UK), Dr. Rashad Alqasim (Qatar), Dr. Manijeh Ryan (Iran, training in USA), Dr. S. Chowdhury (UK). We are currently training two Canadian pain management fellows. There is no doubt that the enhanced training in pain management

is a direct result of the UTCSP and excellent interhospital relationships.

Knowledge Translation for Facilitators –the University of Toronto and beyond. As part of the preparation for the IPC, clinician facilitators undergo an intensive three-hour facilitator development program and are provided with a facilitator manual that includes the latest references pertinent to the student case development. In a recent facilitator survey, 94% identified their participation in the IPC as a unique education experience for themselves and 77% stated their pain knowledge had increased and/or been updated through the IPC. Therefore, this training functions as an annual interactive knowledge translation (KT) activity for these clinicians educating them in the latest developments in pain research and management (the facilitator manual for 2008 is included in Appendix 10). Thus, a direct consequence of the IPC, in addition to the training of undergraduate health professionals, is KT through continuing education of post-graduate practitioners across medical, dental, nursing, pharmacy, occupational therapy and physical therapy professions.

The UTCSP-housed STIHR *Pain: Molecules to Community (Pain M2C)* has developed a novel collaboration with the program in Biomedical Communications in the Faculty of Medicine at the University of Toronto. *Pain M2C* supports two students each year in Biomedical Communications, each of whom produces a visualization project on a topic in the general area of pain. To date, we have created a library of ten visualization projects; five of which are animations and five of which are web-based interactive tools. These visualization projects have been presented widely to diverse audiences from students in undergraduate course, to scientists at international conferences, to the scientific directors of CIHR, to senior citizens and children at public lectures. The visualizations have been so successful that they are regularly requested whenever they are shown. Because of the demand for these visualizations, *Pain M2C* compiled all of the Biomedical Communications projects onto a single DVD that was given to each of the more than 6,000 attendees at the IASP World Congress on Pain in August 2008 in Glasgow. A copy of the DVD is included in Appendix 11.

Communications

UTCSP Website. Our main communications portal, particularly for communication with those outside University of Toronto, is the UTCSP website www.utoronto.ca/pain/.

UTCSP “eNews”. For communications with UTCSP members, the UTCSP *eNews* was developed. The *eNews* is a monthly electronic newsletter which provides information highly relevant to UTCSP members. For example, research breakthroughs on pain by UTCSP members and others milestones for UTCSP members, and on upcoming seminars, symposia and hiring opportunities are regularly reported. All issues of the *eNews* are available on the website www.utoronto.ca/pain/newsletters.html.

Recruitment

With the funding from the APF, the UTCSP was awarded salary lines for four tenure-track positions. Through discussions with the Advisory Committee, priorities for hiring were established and it was decided to begin with a combined search for two positions. With the combination of funding from the APF positions, the CRCs and the CRC-associated

infrastructure awards from the CFI, we put together recruitment packages of salary, start-up, research support and equipment that were internationally competitive. As a consequence of these comprehensive packages we were able to recruit two established leaders in pain research to the University of Toronto.

1. We first recruited Dr. Ze'ev Seltzer, from Hebrew University in Jerusalem in 2002. Dr. Seltzer is a world expert on pain modeling and neurobiology, and a leader in the emerging field of pain genetics. Dr. Seltzer is Full Professor in Faculty of Dentistry and was awarded Tier I CRC in *Pain Genetics*. Dr. Seltzer has a unique collection of DNA and other human material from well-phenotyped patients with neuropathic pain and controls, which has been expanded upon during his time in Toronto. From analysis of this material at University of Toronto facilities Dr. Seltzer has identified several pain-modifying genes. He has been awarded over \$1.2M funding for his research from the NIH USA, a major accomplishment especially for a foreign researcher. Dr. Seltzer's research has been greatly facilitated by being in the UTCSP as this is conducted in collaboration with a team of UTCSP members including Drs. Beggs, Salter and Sessle. Dr. Seltzer has been recruited to the *Neuropathic Pain Clinical Database* to help mine genetic data (described above). He is an integral contributor to undergraduate and graduate courses on pain.

2. Dr. Min Zhuo, our second recruit, was from Washington University in St. Louis in 2003. Dr. Zhuo is a world leader on the cellular/molecular biology of pain and the use of transgenic models in pain research. Washington University has one of the best Neuroscience Programs in the US, thus making this recruitment an outstanding accomplishment. Dr. Zhuo is appointed Full Professor in the Department of Physiology, Faculty of Medicine. After nomination by the UTCSP Director through the office of the President of the University of Toronto, Dr. Zhuo won the first EJLB-CIHR Michael Smith Award in Neuroscience and Mental Health, an award co-sponsored by the CIHR, the EJLB Foundation and the Royal Society of Canada. In addition, Dr. Zhuo was awarded a Tier I CRC in the *Neurobiology of Pain and Cognition*, and a Premier's Research Excellence Award. He holds research operating grants from CIHR and NIH, and is a member of the Neuroscience Canada Team Grant on Neuropathic Pain. Thus, the UTCSP has provided directly and indirectly many resources that have accelerated Dr. Zhuo's research program. In 2000 Dr. Zhuo co-founded, as co-Editor-in-Chief, the open-access journal *Molecular Pain* which in July 2008 was the top-ranked of 87 journals in "Anesthesiology and Pain Medicine" by SCImago Journal & Country Rank. Dr. Zhuo also is the founder of the International Conference on Neurons and Brain Disease in 2005, a highly successful annual meeting that has brought researchers on pain and neuroplasticity from around the world to the University of Toronto. He is very active in teaching within the Department of Physiology and is director of the course on "Molecular Basis of Behaviour".

Subsequently, we identified pain clinician-scientist and translational/population pain researcher positions as priorities for recruitment. Through the search process, several candidates were considered appropriate and they were interested in moving to Toronto. However, during negotiations with these candidates non-research considerations in terms of obtaining Canadian licensure, or issues with finding positions for spouses precluded hiring of any of these individuals. The UTCSP remains committed to complementing existing UTCSP

members with these positions and therefore, these remain priority areas for hiring in the UTCSP.

Philanthropic Fundraising

Over \$500,000 has been raised, primarily by donations from the pharmaceutical industry, to support and expand the educational and research initiatives of the UTCSP and its members (for details see Appendix 12). These funds have been disbursed across the member Faculties. The funds have been directed towards either research or educational activities but, beyond that, the use of the funds is unrestricted by the donors. Importantly, the donors remain at arms-length from the content of the educational and research initiatives supported by the funding.

National/International Activities

Our mandate is to lead nationally and internationally in pain research and education. In addition to the research and educational activities described above, members of the UTCSP are involved in the strategic planning and organization of national and international pain programs.

UTCSP in CurePain – The Canadian Pain Network. Several members of the UTCSP have had major roles in the conceptualization and development of strategic planning of pain research at the national level. Through initial funding by the MRC/CIHR transitional year “consortium” program, we first established the Canadian Pain Consortium. Subsequently we have brought together pain researchers from coast-to-coast in CurePain – The Canadian Pain Network. Through the cross-Canada network of pain researchers, the UTCSP has been an important player in the development of national clinical research networks on pain.

UTCSP in establishing National Pain Awareness Week in Canada. Members of the UTCSP had leadership roles in advocating nationally for pain through meeting with members of parliament and promoting the concept of a national week on pain sanctioned by the federal government of Canada. In particular, UTCSP members were part of a small group of academics, researchers and lay persons who met with Senator Yves Morin, who was convinced to sponsor the bill which proclaimed beginning in 2005 the first week in November each year as National Pain Awareness Week. (<http://www.canadianpaincoalition.ca/index.php/en/national-pain-awareness-week/senate-resolution>) Establishing National Pain Awareness week has been a key step in increasing understanding by the public and government of the major social, personal and economic problems of pain in Canada. Support of lay groups has been galvanized by National Pain Awareness Week which has accelerated the development and growth of the Canadian Pain Coalition (<http://www.canadianpaincoalition.ca>) of which Dr. Michael Salter is a member of the Board of Directors.

UTCSP in Institute Advisory Boards of CIHR. Two members of the UTCSP have been in strategic leadership roles as inaugural members of the Institute Advisory Boards of the CIHR. Dr. Michael Salter was a member of the Advisory Board of the Institute of Neuroscience, Mental Health and Addiction, and Dr. Bonnie Stevens was Vice-Chair of the Advisory Board of the Institute of Human Development Child and Youth Health.

UTCSP in the International Association for the Study of Pain (IASP). The IASP is the pre-eminent international organization devoted to pain education and research. As described above, various members of the UTCSP have had and currently have leadership roles in the IASP.

IV. Major Strategic Goals for next five years

The UTCSP is now well-established and we have made major advances towards our objective of being a model of interdisciplinary collaboration in the creation and dissemination of knowledge about pain. In the next five years, we will strive to consolidate the gains we have made, to also expand key activities and to develop novel initiatives and relationships. Specifically, our goals will be to:

- Build on successes in research, research-training and education
- Expand linkages between basic scientists, clinician scientists and clinicians
- Accelerate the translation of research discoveries to clinical and community settings

The new Director of the UTCSP will take responsibility for overall leadership and commitment to achieving these goals and developing specific strategies to do this with guidance from the Advisory Committee. Implementing the strategies will be done through the Research and Education Committees. It is anticipated that the membership in these Committees will be regularly renewed in order to facilitate the participation of the growing membership of the UTCSP.

Research Goals and Initiatives

Aggressively pursuing of funding will allow for growth of research in the UTCSP. Given our experience with large-scale applications, we are poised to take advantage of new opportunities as they arise from national and international sources. Our specific goals include:

1. Enhancing internal support of research activities through the following:

- Continuing to support clinician-scientist initiatives and searching for innovative ways to leverage funds for these awards and creating new awards. The Clinician-Scientist and Purdue Pharma OGGST competitions are growing in numbers of applicants every year. These UTCSP programs are key to developing research in future generations of scientists.
- Continuing to support regular series of seminars and the UTCSP Annual Pain Day. We will also extend support to research seminars, symposia and meetings, and will actively pursue existing and new sources of funding for this purpose.
- Pursuing industrial support for research activities of the UTCSP. Such support must be with 'no strings attached' to preserve the research independence of UTCSP members, as was the donation from AstraZeneca.

2. Facilitating basic and clinical science research interactions and joint projects through:

- Continuing to strengthen interactions between basic and clinical science through the support of clinician-scientist trainees, interdisciplinary research teams and STIHR

- programs, all of which have linkages between basic and clinical researchers
- Capitalizing on new funding opportunities designated for pain (e.g. CIHR INMHA and IMHA) which link clinical and basic scientists as co-investigators and introducing novel funding initiatives (e.g. personnel support for trainees involving both basic and clinical scientists on supervisory panels both inside STIHR programs and within Faculties at the University of Toronto).
 - Strengthening the translational components (see below) of research; by educating UTCSP scientists on the value of a KT component in all research and particularly articulating the differences and interactions in KT for basic and clinical scientists and clinicians.

3. Expanding studies of the efficacy and effectiveness of pain relieving treatments by:

- Enhancing clinical trials capabilities by using the CFI-funded Canadian Clinical Trials Network as a platform onto which can be built larger infrastructure and projects, and securing additional research personnel and resources to more effectively move discoveries in therapeutics, diagnostics and knowledge translation research into the clinical setting.

4. Keeping the UTCSP strategically positioned within the national research networks in which pain is a major component by:

- Continuing to foster and develop CurePain;
- Expanding UTCSP membership in the Canadian Arthritis Network (CAN) for the remaining years of this network.
- Participating in potential new large-scale funding opportunities on pain from CIHR in the (i) Institute of Musculoskeletal Health, (ii) the Institute of Neurosciences, Mental Health and Addictions, (iii) infrastructure funding on pain from upcoming CFI competitions. The success of pain researchers at the national level in funding for the Clinical Trials Network and for the STIHR programs, provides a springboard for even larger-scale infrastructure funding. Given the research leadership of the UTCSP, we need to take a leadership role in CFI proposals on pain in the future.

Research-Training Goals and Initiatives

The UTCSP will continue to support and build strategic training initiatives.

5. Providing interdisciplinary and collaborative training opportunities through:

- Leading and collaborating in STIHR re-applications in 2008. As mentioned above, the three existing STIHRs on pain have been highly successful, having funding extensions to 2009, and the UTCSP is heavily involved in each of these. The next competition for the STIHR programs is now underway and ‘renewal’ applications for each of the pain STIHRs have been submitted. Each of the STIHR applications has successfully passed the letter-of-intent stage and full applications have been requested with a deadline in fall 2008. The UTCSP will have its largest role in *Pain M2C* and will continue to actively support *CellSignals* and *PICH*. *Pain M2C* was originally configured as a team of 18 Principal Investigators in 2002. With the growth in the number of pain researchers in the UTCSP and also in other centres in Ontario and

Quebec, the new *Pain M2C* has been configured as a merger of the training in the pain centres including the UTCSP, and other Ontario centres, and the Quebec Pain Research Network. This expansion will expand membership potential for new faculty and emerging scientists and open up training opportunities for trainees of all members of the UTCSP. *Pain M2C* and the other STIHRs have been critical for leveraging the training funds from the UTCSP, and for facilitating interactions between clinical and basic trainees. These training programs have thus become a vital part of the research training strategy of the UTCSP. Conversely, the UTCSP is necessary for the success of the STIHRs. Without the support of the UTCSP, the structure of *Pain M2C* would be greatly weakened, thus compromising *Pain M2C* and potentially the other STIHRs. Thus, the UTCSP and its support of the STIHRs on pain is essential for the success of the renewal and expansion of these highly innovative research training programs.

Educational Goals and Initiatives

As described above, the IPC has become our premiere educational event. The UTCSP-IPC experience has provided diverse and valuable insights for future curriculum planning at not only the undergraduate level but for graduate and clinician education. Our ongoing evaluation has demonstrated that this curriculum has enabled health science students to acquire knowledge and skills related to pain management in a unique interprofessional learning environment. This iterative model of collaborative, inter-professional planning to create a dynamic learning experience for undergraduates should be applied to graduate programs and more formal continuing education opportunities. Therefore, the UTCSP will not only support the continued development of the IPC but will also develop new educational initiatives particular for post-licensure health care practitioners.

6. Continuing to support UTCSP-IPC and future expansion by:

- Developing methods to evaluate creative ways to enhance the learning process (e.g. RCTs using simulation methods for pain assessment, communication of knowledge on pain) and clinical (e.g. improvement in pain intensity scores, patient satisfaction) outcomes.
- Expanding the research component of our initiatives to evaluate long-term outcomes and contributing factors to student learning about pain in an interprofessional context, along with University of Toronto colleagues in the Wilson Centre for Research in Education (Brian Hodges, Glenn Regher) the Professional Development Program/Knowledge Translation Program (Ivan Silver), and Office of Interprofessional Development (Ivy Oandasan).
- Securing funding to support research initiatives emerging from the curriculum development project through funding sources such as: CIHR; Health Canada; Wilson Centre's Academic Incentive Fund proposal to offer fellowships in Interprofessional Healthcare and Practice Research; revenue generating continuing education and professional development programs. The experience gained from translation of knowledge to undergraduates and in evaluating that process should be leveraged to

- provide knowledge translation services for other groups.
- Developing and evaluating the interprofessional development model that is currently being piloted with the facilitator group, in collaboration with Ivan Silver and Ivy Oandasan.
 - Determining pain education directions at the graduate and post-graduate level that can complement and be derived from the undergraduate experience.
 - Establishing procedures to respond to requests for the model/materials from Canadian Universities and beyond, and fostering enhancements in pain education at universities across Canada.
 - Disseminating the development, implementation and evaluation of our initiatives through publications, presentations at international, national and local forums and interactive milieu which promote collaboration across disciplines and sectors (i.e. including research, education, practice, policy and industry).
 - Developing a line of scholarly and creative professional activity around consolidation of a Pain Education research and development program. To build upon the success of the UTCSP in meeting its educational mission, resources need to be dedicated to this process. One requirement is for a faculty member who will be an academic researcher experienced in the field of education-based behaviour change in clinicians, students, patients and scholars, related to understanding pain mechanisms and the experience of persons living with pain. Given the emerging expertise at University of Toronto in the process of knowledge translation and research in education, we will focus on recruiting a content expert with demonstrated scholarship, research and education expertise. Given the UTCSP's interdisciplinary and interprofessional foundations, this program would be expected to leverage resources in other interprofessional and interdisciplinary education research and development programs and to ensure that enhancing pain management through interprofessional collaboration be promoted as a worthy focus of education research.
 - Facilitating the establishment of a qualifying curriculum and examination that will create a specialty designation in pain management through the Royal College of Physicians and Surgeons of Canada.

Knowledge Translation Goals and Initiatives

The UTCSP will expand the knowledge translation (KT) activities for the development of new therapeutic and diagnostic innovations, and to support the exchange of research knowledge into clinical practice guidelines, policies and initiatives.

7. Supporting therapeutic/diagnostic innovation, and exchange of research knowledge by:

- Facilitating therapeutic and diagnostic innovation. Discoveries by UTCSP members concerning molecular processes that may underlie chronic pain are being developed

through biotechnology companies founded by those members. To date this translational research has been done largely by individual effort, has been a relatively slow process, and limited to molecular therapeutic interventions. In order to accelerate the translation of discoveries into novel therapeutics a coordinated process should be delineated and implemented. This process should not be limited simply to molecular/pharmacological interventions but should also include other types of interventions (eg. behavioural, physical) and also the translation of discoveries into novel aids for pain diagnosis.

- Translating research knowledge into clinical practice. As has been repeatedly demonstrated with existing pain therapeutics, a critical bottleneck is the translation of research knowledge into clinical practice. Generating new knowledge on therapeutics, or diagnostics, alone is not enough without knowledge of how to change this research evidence into effective therapeutic interventions for use by clinicians. The UTCSP has rapidly developed expertise in the area of knowledge translation on pain and this should be facilitated in the coming years. One effective approach has been through the Mayday Foundation Pain and Society Fellowship Program. This unique US based program offers intense six month programs to coach and mentor senior researchers in Canada and the US in translating research into practice, advocacy and working with public policy and administrative officials. Recently, two UTCSP members (Drs. Anna Taddio and Bonnie Stevens) have been awarded these prestigious fellowships. One of our goals will be to expand applications to enhance the numbers of UTCSP members who will benefit from this opportunity and to have those trained take on the leadership for developing a coordinated interdisciplinary knowledge translation plan for all members of the UTCSP.