ANNUAL REPORT
2013-2014 ACADEMIC YEAR

DR. MARK J. GIERL, DIRECTOR

Centre for Research in Applied Measurement and Evaluation
6-110 Education Centre North
Department of Educational Psychology
Faculty of Education
University of Alberta

AUGUST 15, 2014
This purpose of this report is to summarize the activities conducted in the Centre for Research in Applied Measurement and Evaluation (CRAME) from July 1, 2013 to June 30, 2014. We also note that this academic year, we completed our review for the University of Alberta – Strategic Review Report for Academic Centres and Institutes. Our review was successful. Our next review will occur in 2018.

We begin with an overview, and then highlight our research activities, graduate program outcomes, statistical consulting services, and awards.

A. OVERVIEW

**MANDATE:** CRAME (Centre for Research in Applied Measurement and Evaluation) is a research-intensive centre in the *Measurement, Evaluation, and Cognition* (MEC) area of the Department of Educational Psychology in the Faculty of Education at the University of Alberta. The central purpose of CRAME is to conduct high-quality research and model outstanding research practice in educational measurement by supporting activities such as collaborating with strategic academic and community-based partners, securing research funding, disseminating high-quality and meaningful research studies, and furthering the practice of educational measurement. The current areas of research interest in CRAME include cognitive-based educational assessment, classroom assessment, advanced psychometric and statistical modeling, and program evaluation. It is important to note that CRAME does not offer programs leading to a Master of Education (MEd) and a Doctorate of Philosophy (PhD) degree. However, CRAME is affiliated with the program area Measurement, Evaluation, and Cognition (MEC) in the Department of Educational Psychology in the Faculty of Education, which does offer programs leading to MEd and PhD degrees.

**FACULTY:** Dr. Ying Cui, Associate Professor (PhD, University of Alberta, 2007)
Research Interests: Educational measurement and evaluation; cognitive diagnostic assessment; research design and applied statistical methods.

*Dr. Cui was on a 6-month maternity leave from January 1, 2014 to June 30, 2014.*

Dr. Mark J. Gierl, Professor & Canada Research Chair in Educational Measurement (PhD, University of Illinois at Urbana-Champaign, 1996)
Research Interests: Educational and psychological measurement, focusing on differential item and bundle functioning; cognitively diagnostic assessment; multidimensional item response theory.

Dr. Jacqueline P. Leighton, Professor & Registered Psychologist; Chair, Department of Educational Psychology (PhD, University of Alberta, 1999)
Research Interests: Educational assessment and evaluation, with an emphasis on the assessment of processes involved in reasoning and problem-solving, the development of high-level thinking tasks and items, construct validation, and statistics.

*Dr. Leighton is currently the chair of the Department of Educational Psychology.*

Dr. Cheryl Poth, Assistant Professor (PhD, Queen’s University, 2008)
Research Interests: Classroom assessment; program evaluation; mixed methods research design.

*Dr. Poth was on a 12-month maternity leave from July 1, 2013 to June 30, 2014.*

Dr. Sharla King, Assistant Professor & Director, Health Sciences Education and Research Commons (HSERC) (PhD, University of Alberta, 2001)
Research Interests: Interprofessional education and student team interactions, virtual learning communities, blended learning and simulation education.

*Dr. King has a half-time appointment in the Department of Educational Psychology. She is also the Director of the Health Sciences Education and Research Commons (HSERC).*
**MEC AND CRAME:** *Measurement, Evaluation, and Cognition* (MEC) is one of eight areas in the Department of Educational Psychology. CRAME is a research centre in MEC. The responsibilities and roles of CRAME within MEC are outlined below:

**WEBSITE:** [http://www.education.ualberta.ca/educ/psych/crame/index.htm](http://www.education.ualberta.ca/educ/psych/crame/index.htm)

**B. RESEARCH ACTIVITIES**

**EXTERNAL FUNDING**: One of the objectives in CRAME is to partner with academic and community-based groups to secure research funding in the form of internal or external grants and contracts. In the current academic research climate, research funding is increasingly necessary to explore, conduct, and disseminate educational research findings. Moreover, graduate student research assistantships are a vital aspect of any research laboratory and these assistantships must be funded to allow apprentices the time to (a) be mentored, (b) immerse themselves in a professional research culture, which involves full-time training on conducting high-quality research, (c) network with community contacts, attracting additional funding and, (d) disseminate research findings.

For the 2013-2014 academic year, CRAME faculty helped secure more than $4 million in external funding, serving as the principal investigator, co-investigator, or collaborator on research grants. The breakdown of contracts and grants secured by CRAME faculty (in a capacity as principal investigator, co-investigator, or as collaborator) for the 2013-2014 year is listed below.

<table>
<thead>
<tr>
<th>FUNDING SOURCE</th>
<th>TITLE</th>
<th>FACULTY CONTACT</th>
<th>$ AMOUNT (per year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Sciences and Humanities Research Council of Canada (SSHRC) (2013-2018)</td>
<td>Motivational Interventions in Higher Education: Utilizing Internet and Mobile Technology to Improve Student Development&quot;</td>
<td>Leighton</td>
<td>$264,000</td>
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<tr>
<td>Funding Body</td>
<td>Project Title</td>
<td>Investigator</td>
<td>Funds</td>
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<td>--------------------------------------------------</td>
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<tr>
<td>Social Sciences and Humanities Research Council</td>
<td>Learning Across the Disciplines (LEADs): Supporting Technology Rich Learning Across Disciplines</td>
<td>Leighton</td>
<td>$2,500,000</td>
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<tr>
<td>(SSHRC) (2011-2018)</td>
<td></td>
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<tr>
<td>Social Sciences and Humanities Research Council</td>
<td>The Effects of Attitude Towards Standardized Testing on Learner Disengagement and the Intention to Drop Out of High School”</td>
<td>Leighton</td>
<td>$100,010</td>
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<tr>
<td>of Canada (SSHRC) (2011-2014)</td>
<td></td>
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<tr>
<td>Internal - Vice-President Research (VPR) SSHRC</td>
<td>Cognitive Skill Assessment Using Virtual Environments: Improving the Ecological Validity of Testing Contexts</td>
<td>Leighton</td>
<td>$10,000</td>
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<tr>
<td>Funds (2014-2015)</td>
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<tr>
<td>Social Sciences and Humanities Research Council</td>
<td>On the Classification Consistency and Accuracy of Cognitive Diagnostic Assessment</td>
<td>Cui</td>
<td>$44,503</td>
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<tr>
<td>of Canada (SSHRC) (2011-2013)</td>
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<tr>
<td>Aga Khan Foundation Canada/University of Alberta</td>
<td>Strengthening Teacher Education in Pakistan</td>
<td>Cui</td>
<td>$40,000</td>
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<tr>
<td>2011-2014</td>
<td></td>
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<tr>
<td>Alberta Centre for Child, Family and Community</td>
<td>FASD MacKenzie Housing</td>
<td>Poth</td>
<td>$23,000</td>
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<tr>
<td>Research (2013-2016)</td>
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<tr>
<td>Alberta Centre for Child, Family and Community</td>
<td>Prevention Conversation: A Shared Responsibility</td>
<td>Poth</td>
<td>$75,000</td>
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<tr>
<td>Research (2013-2014)</td>
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<tr>
<td>NWC AB FASD Services Network 2013 to 2014</td>
<td>Facilitating Post-Clinic Support for Children and Adolescents Diagnosed with FASD</td>
<td>Poth</td>
<td>$5,000</td>
</tr>
<tr>
<td>Social Sciences and Humanities Research Council</td>
<td>Developing and Evaluating Cognitive Models for Diagnostic Assessment</td>
<td>Gierl</td>
<td>$49,500</td>
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<tr>
<td>of Canada (SSHRC) (2011-2014)</td>
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<tr>
<td>Social Sciences and Humanities Research Council</td>
<td>Canada Research Chair (Tier I) in Educational Measurement</td>
<td>Gierl</td>
<td>$200,000</td>
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<tr>
<td>of Canada (SSHRC) (2013-2020)</td>
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<tr>
<td>Social Sciences and Humanities Research Council</td>
<td>Developing Tools to Predict New Teacher Effectiveness</td>
<td>Gierl</td>
<td>$54,000</td>
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<tr>
<td>of Canada (SSHRC) (2012-2017)</td>
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<tr>
<td>CTB/McGraw-Hill Innovation Research and Development Program (2014)</td>
<td>Developing a Methodology for Multilingual Automatic Item Generation</td>
<td>Gierl</td>
<td>$80,734</td>
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</table>
Alberta Health and Wellness (2013-2015) | Enhancing Interprofessional Care Processes through Experiential Learning | King | $536,666

Teaching and Learning Enhancement Fund (2013-2015) | The Use of Mobile Technology to Enhance Learning Through Online Communities of Practice Among Occupational Therapy Students in Edmonton and Calgary | King | $111,000

Institute for Continuing Care Education and Research 2013-2014 | Developing an Educational Model to Support the Care of Aboriginal Populations in Continuing Care in Remote Northern Communities | King | $9,941

Network of Excellence in Seniors’ Health and Wellness Innovation Fund Application, Covenant Health 2014-2015 | From Cooperative Learning Strategies to Quality Continuing Care Workplaces | King | $200,000


**ADVISORY ROLES:** The faculty in CRAME often serve as external advisors to different organizations because of their expertise in educational measurement, statistics, and research methodology. Some of this work may be related to on-going contracts with CRAME faculty members. However, some of this work is conducted on a voluntary basis to support our colleagues on and off-campus, and to uphold our mandate to facilitate the practice of high quality research and practice in educational measurement. These leadership roles, for the 2013-2014 academic year, are summarized below.

<table>
<thead>
<tr>
<th>Organization</th>
<th>Leadership Role</th>
<th>Faculty Member(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Institute of Certified Public Accountants (USA)</td>
<td>Member of Psychometric Oversight Committee and Sponsor Group Member</td>
<td>Leighton</td>
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<tr>
<td>Puerto Rico Department of Education (USA)</td>
<td>Member of Technical Advisory Committee</td>
<td>Leighton</td>
</tr>
<tr>
<td>College Board (USA)</td>
<td>Grades 6-12 ELA Development Committee</td>
<td>Leighton</td>
</tr>
<tr>
<td>McGill University (Canada)</td>
<td>Theme Leader (Assessment) for SSHRC LEADS Partnership Grant</td>
<td>Leighton</td>
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</tbody>
</table>
RESEARCH PRODUCTIVITY: Without dissemination of research findings, CRAME cannot meet its mandate. Therefore, a core value in our centre is the emphasis on knowledge mobilization, including publishing papers, preparing reports, and presenting at international, national, and local conferences. In the 2013-2014 academic year, CRAME faculty published 2 book chapters, 7 peer-reviewed publications, and 7 reports. CRAME faculty also presented 33 conference papers and delivered 10 invited presentations. The breakdown of research dissemination by CRAME faculty is listed below. CRAME faculty member names are highlighted in bold.

### Book Chapters


### Peer-Reviewed Publications


<table>
<thead>
<tr>
<th>National Natural Science Foundation of China</th>
<th><strong>Co-Principal Investigator: The extension of Q matrix theory and research on its applications to cognitive diagnosis</strong></th>
<th>Cui</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAO UX Group, Open Assessment Technologies S.A., Luxembourg</td>
<td><strong>TAO Open-Source Computer-Based Testing Contributor</strong></td>
<td>Gierl</td>
</tr>
<tr>
<td>National Council on Measurement in Education</td>
<td><strong>Program Co-Chair, Panel 7: Innovative and Technology-Enhanced Assessments</strong></td>
<td>Gierl</td>
</tr>
</tbody>
</table>
Reports


Conference Presentations


**Invited Presentations**


10. **Gierl, M. J.** (2013, August). *Using multimedia score reports to enhance the delivery of formative assessment feedback*. Invited presentation at the Test Development Connections Conference, American College Testing (ACT, Inc.), Iowa City, IA.
C. GRADUATE PROGRAMS

UNDERGRADUATE EDUCATION: Dr. Poth served as the coordinators for the undergraduate assessment course in the Faculty of Education, EDPY 303. This course is required by all pre-service education students. There are 12 sections per year, with approximately 100 to 150 students per section during the Fall and Winter, and approximately 50 during the Summer, offered on the main campus. Additional sections of the course are also offered off-campus in the B. Ed. Programs located throughout Alberta (e.g., Grand Prairie, Red Deer, Blue Quill, and Medicine Hat).

GRADUATE: The CRAME faculty offer courses in two MEC graduate programs—students can either pursuing a Master of Education (M.Ed.) or a Doctor of Philosophy (Ph.D.) degree in Measurement, Evaluation, and Cognition. CRAME faculty taught seven graduate-level courses in the 2013-2014 academic year.

CURRENT GRADUATE STUDENT ENROLLMENT (2013-2014):

<table>
<thead>
<tr>
<th>Program</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master of Education</td>
<td>6 Students</td>
</tr>
<tr>
<td>Doctor of Philosophy</td>
<td>11 Students</td>
</tr>
</tbody>
</table>

In addition to supervising the graduate students in CRAME, our faculty also serve as supervisory committee members or external members on graduate student committees both inside and outside the Faculty of Education.

D. STATISTICAL CONSULTING AND SUPPORT SERVICES

In CRAME our central purpose is to conduct high-quality research and model outstanding research practice in educational measurement by supporting activities such as collaborating with strategic academic and community-based partners, securing research funding, disseminating high-quality and meaningful research studies, and furthering the practice of educational measurement. One way in which we meet these goals is by providing leadership in the practice of measurement research and analysis. Toward this end, CRAME provides research methodology support and statistical consulting services to both students and faculty throughout the University. CRAME is only 1 of 2 academic units to offer statistical consulting services (the other being in the Department of Mathematical and Statistical Sciences). We have one student consultant in the Fall term and 1.5 consultants in the Winter and Spring/Summer terms. The consultants are typically senior CRAME students who have not only completed senior-level statistics courses but have also exemplified outstanding command of statistical techniques and application. These consulting services are normally offered on a —problem-focused— basis meaning that they are not on-going or open-ended but are designed to assist students and faculty solve specific analytical problems within a short time frame as they arise in their research. Statistical consulting services are supervised by Dr. Cui.

In 2013-2014, we provided statistical consulting services for 47 clients. Our clients came from diverse departments on campus including medicine, physical education and recreation, pediatrics, agriculture, elementary education, nursing, human kinetics, rehabilitation, pharmacy, human nutrition, computer science, general surgery, psychiatry, health education, modern languages and cultural studies, educational policy studies, biomedical engineering, speech pathology and audiology, school of Library and information studies, in addition to serving students and faculty in Educational Psychology.
E. FACULTY AND STUDENT AWARDS

As leaders in both the research and application of educational measurement and statistical processes and procedures, faculty CRAME received a number of research awards in 2013-2014. CRAME faculty also assist and support graduate student training and applications for internships and scholarships.

- **Dr. Mark Gierl** – *Canada Research Chair (Tier I) in Educational Measurement*

  “Tier 1 Canada Research Chairs, tenable for seven years and renewable, are for outstanding researchers acknowledged by their peers as world leaders in their fields. For each Tier 1 Chair, the university receives $200,000 annually for seven years.”

- **Man-Wai Chu** – *Izaak Walton Killam Memorial (Doctoral) Scholarship* (valued at $35,000/year for two years – 2014-2016).

  “This is the most prestigious graduate award administered by the University of Alberta. Every effort is made to honor the criteria set out in the will of Dorothy Killam. It was Mrs Killam’s desire that those awarded scholarships and fellowships be likely to contribute to the advancement of learning or to win distinction in their profession.”