# Table of Contents

TAYLOR-SWANSON, LISA - #1922 - Mechanisms of Action of Acupuncture for the Reduction of Chronic Low Back Pain .................................................. 1  
VPCAT 2020 Senior Mentor Selection Form ........................................... 5  
VPCAT 2020 Combined PDF Application .............................................. 6
## Application Summary

### Competition Details

<table>
<thead>
<tr>
<th>Competition Title</th>
<th>2020 Vice President's Clinical and Translational (VPCAT) Research Scholars Program Application</th>
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<tr>
<td>Category</td>
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<td>Submission Deadline</td>
<td>09/27/2019 at 5:10 PM</td>
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### Application Information

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<thead>
<tr>
<th>Submitted By</th>
<th>LISA TAYLOR-SWANSON</th>
</tr>
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<tr>
<td>Application ID</td>
<td>1922</td>
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<tr>
<td>Application Title</td>
<td>Mechanisms of Action of Acupuncture for the Reduction of Chronic Low Back Pain</td>
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<td>09/27/2019 at 1:09 PM</td>
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### Personal Details

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<tr>
<th>uNID (U of U ID number/u0000000)</th>
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<tbody>
<tr>
<td>Applicant First Name</td>
<td>LISA</td>
</tr>
<tr>
<td>Applicant Middle Initial</td>
<td>J</td>
</tr>
<tr>
<td>Applicant Last Name</td>
<td>TAYLOR-SWANSON</td>
</tr>
<tr>
<td>Applicant Alias (i.e., Name Applicant Prefers to Go By):</td>
<td>Lisa Taylor-Swanson</td>
</tr>
<tr>
<td>Applicant Degree(s)</td>
<td>PhD, MAcOM</td>
</tr>
<tr>
<td>Academic Rank (i.e., Primary Appointment Title):</td>
<td>Assistant Professor</td>
</tr>
<tr>
<td>If selected &quot;Other Title,&quot; please designate your Primary Appointment Title:</td>
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<tr>
<td>Secondary Appointment Title (i.e., clinic director, chair, chief, etc.):</td>
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<tr>
<td>Division</td>
<td>HSCBC</td>
</tr>
<tr>
<td>Email Address</td>
<td><a href="mailto:lisa.taylor-swanson@nurs.utah.edu">lisa.taylor-swanson@nurs.utah.edu</a></td>
</tr>
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<tr>
<td>ORCID Identifier # (if applicant does not have an ORCID, please register for a unique ID via <a href="http://www.orcid.org">www.orcid.org</a>):</td>
<td><a href="https://orcid.org/0000-0002-9116-6369">https://orcid.org/0000-0002-9116-6369</a></td>
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<td>Race:</td>
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<td>Do you have a disability? (NIH defines individuals with disabilities as those with a physical or mental impairment that substantially limits one or more major life activities):</td>
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<tr>
<td>Are you from a disadvantaged background? (see NIH NOT-OD-15-053 for definition):</td>
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<tr>
<td>Separating each with a semicolon, list up to 5 key scientific terms aligned to your research interests that we could use to search for funding opportunities via online systems (i.e., Grants.gov, NIH, Pivot, etc.):</td>
<td>acupuncture; interoception; chronic pain; menopause; opioid</td>
</tr>
<tr>
<td>Separating each with a semicolon, list up to 5 funding agencies you are interested in submitting an application for funding considerations. NOTE: If you are interested in the National Institute of Health (NIH), provide the name of the specific institute.:</td>
<td>NCCIH; NIDA; DOD</td>
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<td>Are you a Scholar in one of the following programs?:</td>
<td>None of the Above</td>
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<tr>
<td>Administrative Assistant First Name:</td>
<td></td>
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<td>Administrative Assistant Last Name:</td>
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<td>Administrative Assistant Email:</td>
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<tr>
<td>Administrative Assistant Phone #:</td>
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## Application Details

### Proposal Title
Mechanisms of Action of Acupuncture for the Reduction of Chronic Low Back Pain

### Unid (U of U ID number/u0000000. If none, list "Not Applicable")

### Scientific Mentor
First Name
Julie

Middle Initial
M

Last Name
Fritz

Alias (i.e., Name Mentor Prefers to Go By)
Julie Fritz

Degree(s)
PhD

Academic Rank (i.e., Primary Appointment Title)
Distinguished Professor

If selected "Other Title," please designate Mentor's Primary Appointment Title

Secondary Appointment Title (i.e., clinic director, chair, chief, etc.)
Adjunct Professor
Scientific Mentor College or School
Medicine

Scientific Mentor Department
Orthopaedic Surgery

Scientific Mentor Division

Scientific Mentor Email Address
julie.fritz@utah.edu

Scientific Mentor Work Phone Number
[Phone number redacted]

Scientific Mentor eRA Commons UserID
juliefritz

Scientific Mentor ORCID Identifier # (if mentor does not have an ORCID, please register for a unique ID via www.orcid.org)
https://orcid.org/0000-0002-3599-1057

Comments to Competition Coordinators

Acknowledgment

Applicant Acknowledgement Statement
[Acknowledged] As an applicant to the Vice President's Clinical and Translational (VPCAT) Research Scholars Program, I acknowledge that everything I have written and included within my application is a true and accurate representation of the work that I have done and aim to do if chosen to be a part of the program. I acknowledge that my application will be reviewed by VPCAT Senior mentors. I understand that upon submission, I will not be allowed to make any further changes to my application.
September 25, 2019

Michael Rubin, MD, PhD, MS  
Director, VPCAT Program  
University of Utah Health Office of Academic Affairs and Faculty Development  
HSEB 5515

Dear Dr. Rubin and members of the VPCAT Research Scholar Program Committee:

I am excited to apply for the Vice President’s Clinical and Translational (VPCAT) Research Scholar Program. The timing of this application is ideal for me to build upon my current pilot work that will ultimately move my work forward to the next level and apply for a NIH K Award. I value the mentoring support provided by the VPCAT program; I am ready to learn all I can from expert VPCAT mentors in conjunction with my identified mentoring team. I am committed to becoming an independently funded researcher able to translate research findings into improved chronic pain outcomes. My proposed VPCAT project will help me move in that direction. As a Licensed Acupuncturist with a PhD in Nursing Science, a Master's in Acupuncture and Oriental Medicine (MAcOM), and a Honors BS in Psychology, I am prepared to conduct innovative research using a transdisciplinary approach that focuses on the examination of a novel mechanism of action of acupuncture in the context of chronic pain that could later be tailored to deliver an enhanced acupuncture intervention. This is a NIH high-impact and priority area, especially given the need to develop and test non-pharmacologic interventions as alternatives to opioid medications to treat pain.

As I will evidence in this application, I am a strong candidate for your program. I am a non-tenured, Assistant Professor in the College of Nursing and early-stage investigator with experience conducting internally-funded pilot work and serving as a contractor for an externally-funded study. College of Nursing Dean Wilson fully supports this application and has committed to protecting a minimum of 30% of my time for research, career development and scholarly activities, as well as my attendance at all VPCAT activities (i.e., orientation, leadership series, and curricular sessions) over the 2-year duration of the program. I am committed to seeking extramural funding to expand my research program (see Research Plan). Dr. Julie Fritz has worked closely with me to develop this application and is committed to serving as my Primary Scientific Mentor (see Letter of Support). She has a long history of nationally funded research and current NIH R01 and PCORI awards specific to chronic pain intervention research. In addition, we are currently preparing a manuscript for peer review and eventual publication (see Curriculum Vitae). My Co-Mentor, Dr. Eric Garland, enhances my mentoring team and complements the expertise of Dr. Fritz (see Letter of Support). In collaboration with Dr. Fritz, he has provided strong guidance while preparing my application. Another strength is that Dr. Garland and I have an established productive collaboration: we are conducting a pilot study testing acupuncture combined with mindfulness (ACUMIND) for chronic pain. I disseminated our initial pilot findings at two international conference podium presentations and through two poster presentations. We are presently writing two manuscripts for peer review publication, including one with Dr. Fritz. I look forward to working in partnership with Drs. Fritz, Garland, my VPCAT mentor, and VPCAT staff to meet and exceed program requirements.

I would like to reaffirm that I meet all the VPCAT Research Scholar Program criteria noted within the Applicant Checklist. I am an Assistant Professor who is guaranteed at least 30% of my time for research (see Table 1), I’m committed to applying for external funding during the VPCAT duration, I have neither served as a PI on an R-level grant nor received a K-series award, and I’m within 5 years of completing my post-doctoral fellowship. Moreover, I have secured protected time to attend the mandatory VPCAT Colloquium.

<table>
<thead>
<tr>
<th>Table 1. VPCAT Candidate’s Responsibilities &amp; FTE</th>
<th>Responsibilities</th>
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<td>Research (State Funded Scholarship, Pilot Award)</td>
<td>52% (VPCAT 30% will be subsumed in total FTE)</td>
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<td>Teaching</td>
<td>37%</td>
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<tr>
<td>Service</td>
<td>10%</td>
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with a very low profile of adverse or serious adverse events, as well as having been demonstrated to
effectively treat chronic pain with moderate effect sizes (see Research Plan). In addition, as research on
acupuncture is being translated to influence practice guidelines and public policy, it essential to increase our
evidence-base in order to safely implement appropriate interventions. For example, the American Academy of
Physicians added acupuncture to first line of treatment of pain; Veterans receive acupuncture treatments
through Veterans Affairs; and multiple states have included acupuncture within health insurance benefits.
Another instance of the increasing acceptance and expanding utilization of acupuncture as standard of care is
the Centers of Medicare and Medicaid Services (CMS) new proposed decision to add access to acupuncture
as an alternative to prescription opioids for people battling with chronic low back pain enrolled as participants
either in clinical trials sponsored by NIH or CMS-approved studies. In regards to the NIH landscape, I am very
excited of the increasing opportunities available to expand my research platform. In early 2019, the National
Center for Complementary and Integrative Health (NCCIH), as part of the NIH HEAL Initiative, solicited
applications for Pragmatic Randomized Controlled Trial of Acupuncture for Management of Chronic Low Back
Pain in Older Adults (UG3/UH3) funding opportunity and, in June 2019, released Request for Information (RFI):
Important Considerations for Potential Creation of an Open-Access Repository or Database for Physiological
and Anatomical Ontology of Acupoints (NOT-AT-19-030) notice to the community. I am in strong alignment
with NCCIH’s priorities of discovering mechanisms of action and testing interventions for pain, as well as their
interests focused on key opioid research programs to battle addiction and chronic pain. I am uniquely poised at
an intersection of conducting cutting-edge integrative health research and critical public need.

Outside of research activities, I enjoy expanding my clinical and scientific collaborations, participating services,
and teaching. As a practicing Acupuncturist for over 17 years, I have and continue to collaborate with
physicians, physical therapists, advanced practice nurses, and others. Through these experiences, I translate
important concepts and research findings regarding acupuncture to my colleagues and patients. Notably, I
have been involved in translating research to public policy. During 2014-2016, I led an interdisciplinary team
that communicated scientific findings to the Medical Director of Washington State Labor and Industries. Our
efforts resulted in the addition of acupuncture to the list of paid health providers for injured workers, which was
the first profession added in 20 years. I am actively engaged in service at an institution, local, and national
level. Within the College of Nursing, I co-lead the Women’s Health RITe and serve on several committees,
including: Research, Search, and the PhD Program Committees. I have had the opportunity to mentor
graduate and undergraduate students, and I serve as Chair for one Honors College student and one graduate
student at Bastyr University. Locally, I serve as the Vice President of the Utah Association of Acupuncture and
Oriental Medicine. At the national level, I was recently appointed to a national pain taskforce Academic
Consortium for Integrative Medicine & Health (ACIMH). I am a member of both ACIMH’s and Academic
Collaborative for Integrative Health’s Research Working Groups, as well as a Site Visitor for the Accreditation
Commission for Acupuncture and Oriental Medicine. Finally, I highly value and engage in teaching activities.
Each academic year I teach one fall course, Foundations of Evidence Based Practice (NURS6700), and I
teach Program Planning, Management and Evaluation (NURS7525) each spring, along with Application of
Outcome Measures for Clinicians (NURS7700) each spring and summer. Teaching affords me an important
opportunity guide the next generation of the biomedical workforce. I receive opportunities to enhance my
mentorship and leadership skills, as well as increase my skills in public speaking. As described in my
Institutional Commitment, my teaching efforts will not impede my career and research development.

In summary, it is my desire to participate in the VPCAT program so that I might have a formal opportunity to
enhance the qualifications necessary to seek a NIH-funded K Career Development Award. Thank you for your
consideration and I look forward to hearing from you.

Sincerely,

Lisa J. Taylor-Swanson, PhD, MAcOM, LAc
Assistant Professor
University of Utah, College of Nursing
801-585-5486
lisa.taylor-swanson@nurs.utah.edu
Curriculum Vitae (CV)

The following CV represents the academic and research scope of Lisa Jean Taylor-Swanson, PhD’s career efforts. The document, last updated September 25, 2019, highlights her accomplishments and research activities. It evidences Dr. Taylor-Swanson’s strong potential to achieve her career and research goals. For the reviewers’ convenience, highlighted areas denote Dr. Taylor-Swanson’s active and pending collaborations with her VPCAT Mentors, Drs. Julie M. Fritz and Eric L. Garland.

EDUCATION

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<th>Years</th>
<th>Degree</th>
<th>Institution (Area of Study)</th>
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<td>1991-1996</td>
<td>BS (Hons)</td>
<td>University of Utah (Psychology, Women’s Studies) Salt Lake City, UT</td>
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<tr>
<td>2011-2015</td>
<td>PhD</td>
<td>University of Washington (Nursing Science) Seattle, WA</td>
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CERTIFICATIONS

2001 - Present Licensed East Asian Medical Provider (EAMP), State of Washington. #AC00000787
2019 - Present Licensed Acupuncturist (LAc), State of Utah. # 10400111-1201

ACADEMIC HISTORY

College of Nursing, 07/01/2017 - Present
2017 Hire, Tenure Track, Assistant Professor

PROFESSIONAL EXPERIENCE

Full-Time Positions

1994 - 1998 Senior Research Associate, University of Utah, Department of Psychology, Alan Fogel lab, University of Utah, Salt Lake City, UT
1998 Research Specialist, Valley Mental Health, Salt Lake City, UT
1998 - 2001 Clinic Administrator, Kang Wen Clinic, Seattle, WA
2001 - 2004 Clinic Director, Licensed Acupuncturist, Advanced Acupuncture, PLLC, Seattle, WA
2004 - 2017 Clinic Director, Licensed Acupuncturist, Abundant Health, PLLC, Seattle, WA
2013 - 2015 Junior Faculty for Inter-Professional Education, University of Washington, Seattle, WA
2016 - 2017 Academic Dean, Seattle Institute of Oriental Medicine, Seattle, WA
2016 - 2017 Postdoctoral Fellow, University of WA, School of Medicine, Bioinformatics & Medical Education, Seattle, WA
2017 - Present Assistant Professor, University of Utah, College of Nursing, Salt Lake City, UT

Part-Time Positions

1997 Research Assistant, Department of Genetics, University of Utah, Salt Lake City, UT
2001 - 2002 Research Assistant, University of Washington, Department of Psychology, John Gottman lab, Seattle, WA
2014 Teaching Assistant, University of Washington, School of Nursing, Seattle, WA
2015 - 2016 Part-time Lecturer, University of WA, Bothell, School of Nursing and Health Studies, Seattle, WA
2015 - 2017 Part time Lecturer, University of WA, School of Nursing, Seattle, WA

Editorial Experience

2015 Guest Editor for a Special Issue: Evidenced-Based Complementary & Alternative Medicine. Issue on women’s health, infertility, midlife women, ART, herbs, acupuncture, and clinical experiences.
Reviewer Experience
2011 - 2013 Invited manuscript reviewer: Alternative and Complementary Therapies
2014 Invited manuscript reviewer for Alternative and Complementary Therapies
2014 Invited manuscript reviewer for Journal of Alternative and Complementary Medicine
2014 Invited manuscript reviewer for BMC: Complementary and Alternative Medicine
2017 - Present Invited manuscript reviewer: Journal of Alternative and Complementary Medicine, International Journal of Qualitative Studies in Health & Well-being, Complementary Therapies in Medicine

SCHOLASTIC HONORS
1993 - 1996 Psychology Department full tuition scholarship, University of Utah
1996 Graduated cum laude in Psychology from University of Utah, Salt Lake City, UT
1996 Graduated with Honors from University of Utah, Salt Lake City, UT
1996 Best Undergraduate Researcher, Department of Psychology, University of Utah
1996 Beehive Honor Society, 1 of 17 graduating seniors selected, University of Utah
1996 Phi Kappa Phi National Honor Society
1996 Skull & Bones National Honor Society
1996 Owl & Key National Honor Society
1996 Golden Key National Honor Society
1996 Psi Chi National Honor Society
1998 Graduate Studies Fellowship, Phi Kappa Phi, University of Utah
2000 Jan McGee Memorial Scholarship, Seattle Institute of Oriental Medicine. First recipient of the school’s only scholarship, Seattle, WA
2011 - 2013 Zesbaugh & Crowley Scholarships, School of Nursing, University of Washington, including monthly stipend and medical coverage
2012 Peter & Rose Christie Endowed Fund – travel funds to attend Western Institutes of Nursing (WIN) conference
2012 Nursing Scholarship Fund – travel funds to attend the Council on the Advancement of Nursing Science conference
2012 - 2013 Mortar Board Scholar Graduate Scholarship – University of Washington chapter
2013 Society for Chaos Theory in Psychology & Life Sciences – conference registration scholarship
2013 deTornyay Center Travel Fund – travel funds for WIN
2014 deTornyay Center Travel Fund – funds to pay for a poster for WIN
2014 Stevenson Scholarship Fund Travel Award – travel funds to attend WIN
2014 IN-CAM Scholarship to attend conference, Calgary, AB, Canada
2014 McLaws Nursing Scholarship for dissertation studies, UW School of Nursing
2014 Society for Chaos Theory in Psychology & Life Sciences – conference registration scholarship
2014 - 2015 Robert G. & Jean A. Reid Endowed Pre-Doctoral Fellowship – tuition coverage, health insurance and stipend
2015 UW School of Nursing scholarship – travel funds to attend WIN
2015 Sigma Theta Tau Honor Society in Nursing
2017 University of Washington Office of Postdoctoral Affairs Travel Award
ACADEMIC SERVICE
2013 - 2015 PHD Curriculum Committee (PHDCC) Student Rep, School of Nursing, University of Washington
2014 - 2017 Special task force of PHDCC student reps to evaluate Nursing Methods courses. Responsible for collecting campus-wide methods and statistics coursework information to report back to PHDCC general committee and prepare in pdf format for future students and their academic advisors. Providing leadership for this committee.
2017 - 2018 Baccalaureate Committee, College of Nursing, University of Utah
2017 - Present Site Visitor, Accreditation Commission for Acupuncture and Oriental Medicine (ACAOM)
2017 - Present PhD Committee, College of Nursing, University of Utah
2017 - Present Search Committee, College of Nursing, University of Utah
2017 - Present Research Working Group member, Academic Collaborative for Integrative Health (ACIH)
2017 - Present Research Working Group member, Academic Consortium for Integrative Medicine & Health (ACIMH)
2019 - Present Co-Chair, Women’s Health Research & Information Exchange (WH RITe), College of Nursing, University of Utah
2019 - Present Pain Taskforce member, Academic Consortium for Integrative Medicine & Health (ACIMH)

MEMBERSHIPS IN PROFESSIONAL SOCIETIES
1996 Beehive Honor Society – 1 of 17 undergraduates selected from the class of 1996, University of Utah
1996 Golden Key National Honor Society
Mortar Board National Honor Society
Owl & Key National Honor Society
Phi Kappa Phi National Honor Society
Psi Chi National Honor Society
Skull & Bones National Honor Society
2001 - 2015 Washington State East Asian Medical Association (WEAMA)
2001 - 2013 National Certification Commission for Acupuncture and Oriental Medicine (NCCAOM)
2009 - 2011 International Society for Complementary Medical Research (ISCMR)
2009 - 2011 Canadian Interdisciplinary Network for Complementary & Alternative Medicine (IN-CAM)
2009 - Present Society for Acupuncture Research (SAR)
2012 - Present Western Institute of Nursing (WIN)
2013 - Present Member, Sigma Theta Tau International (STTI), University of Utah Chapter
2014 - Present Society for Chaos Theory in Psychology & Life Sciences (SCTPLS)
2017 - Present North American Menopause Society (NAMS)

Professional Service
2018 - Present Member, Board of Directors, Academy of Math, Engineering & Science (AMES), President, Parent Teacher Student Association
2018 - Present Vice-President, Utah Association of Acupuncture & Oriental Medicine (UAAOM)
2017 - 2018 Board of Directors, Chair Academic Excellence Committee, American International School of Utah (AISU)
2012 - 2017 Founder & Director of Women of Wellness (WOW), a networking organization for women clinicians and teachers in the South Sound area of Washington state.
2013-2016 Chair, Washington East Asian Medicine Association, Washington Labor and Industries Committee
2013 - Present Member, Access to Acupuncture for Workers Committee, Consultant for Labor & Industries’ review of Traditional East Asian Medicine, WA East Asian Medical Association
2010 - 2011 Advisory Board Member, Everest College, Tacoma, WA
2009 - 2011 Member, Board of Directors, Fund for Women & Girls, Tacoma, WA
2007 - 2010  Advisory Board Member, Jade Institute, Seattle, WA.
2008 - 2000  Herbal Consultant for students in the Jade Institute’s herbal studies program
1999 - 2000  Student Representative of the Advisory Board, Seattle Institute of Oriental Medicine
1995 - 1996  Co-President of Golden Key National Honor Society; Co-President National Organization of Women, University of Utah chapters
1992 - 1993  Senate member, College of Science, Associated Students of the University of Utah

FUNDING
Active Awards
12/1/17 - 12/1/19  Award Type: Pilot Grant
PI(s): Lisa Taylor-Swanson; Annie Budhathoki
Agency: College of Nursing Research Committee, University of Utah and Huntsman Cancer Institute
Title: Acupuncture Treatment of Chemotherapy-Induced Peripheral Neuropathy (CIPN) in Women with Breast and Gynecologic Cancer: Mechanisms of Action and Feasibility.
Goal: Evaluate the feasibility and acceptability of conducting a pilot study of acupuncture for CIPN in an outpatient Integrative Health oncology clinic. Examine trends of change in interceptive awareness and CIPN-related pain among twenty participants.
Amount: $37,000

6/1/19 - 5/31/20  Award Type: Pilot Grant
PI(s): Lisa Taylor-Swanson [Co-Investigator: Eric L. Garland, VPCAT Co-Mentor]
Agency: College of Nursing Research Committee, University of Utah
Title: Pilot Feasibility Study of Acupuncture Combined with Mindfulness (ACUMIND) for Chronic Pain
Goal: Evaluate the feasibility and acceptability of conducting a pilot study of acupuncture plus mindfulness in an outpatient Integrative Health oncology clinic. Examine preliminary trends of effectiveness of acupuncture plus mindfulness versus acupuncture alone in individuals with chronic pain as measured with the Brief Pain Inventory.
Amount: $25,000

09/30/18 - 7/31/20  Award Type: Conference Funding
PI(s): Lisa Taylor-Swanson
Agency: College of Nursing Research Committee, University of Utah
Title: The Nonlinear Datapalooza 2.0: A New Kind of Conference for a New Kind of Science
Goal: The primary goal of the Nonlinear Datapalooza is to connect people to work together during the conference on at least one publishable empirical paper within the 6 months following the conference.
Amount: $3,000

06/19/18 - 7/31/20  Award Type: Conference Funding
PI(s): Lisa Taylor-Swanson
Agency: Vice President for Research Office, University of Utah
Title: The Nonlinear Datapalooza 2.0: A New Kind of Conference for a New Kind of Science
Goal: The primary goal of the Nonlinear Datapalooza is to connect people to work together during the conference on at least one publishable empirical paper within the 6 months following the conference.
Amount: $5,000

Pending Awards
1/01/20 - 12/31/24  Award Type: Combat Readiness--Medical Research Program managed by the office of Congressionally Directed Medical Research Programs (CDMRP)
PI(s): Lisa Conboy
Agency: Department of Defense and New England School of Acupuncture at MCHPS
Title: Validation of Acupuncture Treatment of Veterans with Gulf War Illness Using Plasma Autoantibodies to Neural Proteins for the Treatment of Chronic Low Back Pain.
Goal: To design an acupuncture protocol for veterans with Gulf War Illness.
Amount: $60,000
Role: Consultant

1/30/20 - 12/31/21
Award Type: R21
PI(s): Lisa Taylor-Swanson [Co-Investigator: Julie M. Fritz, VPCAT Mentor]
Agency: NIH, NCCIH
Title: Interoceptive Awareness (IA) and Emotion Regulation (ER) in the Context of Acupuncture for the Treatment of Chronic Low Back Pain.
Goal: Examine the effects of 10 acupuncture sessions on IA and ER compared to attention control and explore relationships between IA, ER, and pain severity. Explore the characteristics of heart rate variability (HRV) in acupuncture compared to attention control.
Amount: $433,040

01/30/20 – 12/31/21
PI(s): Ana Sanchez-Birkhead, Louisa Stark
Agency: NIH, NINR
Title: Developing a Culturally Appropriate Intervention for Promoting Health in Mid-life Adults Across Five Diverse Communities in Utah
Goal: Identify how women and men in 5 communities define health and healthy behaviors and what barriers and facilitators they experience to optimal health including social, economic, and cultural factors. Through a community-engaged approach we will develop a culturally-relevant, community-based intervention that promotes health, supports well-being, and prevents illness in diverse mid-life adult populations.
Amount: $419,375
Role: Co-Investigator

Past Awards
2011 - 2013
Award Type: Achievement Rewards for College Students (ARCS)
PI(s): Lisa Taylor-Swanson
Agency: School of Nursing, University of Washington
Goal: The purpose of this study was to test the association of two dimensions of self-awareness with hotflash (HF) severity.
Amount: $17,000

2014 - 2017
Award Type: DODW81XWH-15-1-0695
PI(s): Lisa Conboy
Agency: Department of Defense
Title: Understanding Symptom Response to Acupuncture Treatment
Goal: The goals of the project are to determine the relationships between dose of acupuncture and effect on secondary outcomes and the relationship of dose and clinical improvement in a sample of veterans with Gulf War Illness who received acupuncture treatment.
Amount: $395,880
Role: Consultant

2016 - 2017
Award Type: Postdoctoral Fellowship
PI(s): George Demiris
Agency: National Library of Medicine
Title: Biomedical and Health Informatics Training Program
Goal: The goal of this project is to expand knowledge related to Complementary and Integrative Health and Health Informatics.

Amount: $826,624
Role: Postdoctoral Fellow

**TEACHING RESPONSIBILITIES/ASSIGNMENTS**

**Course Lectures**

- **2015**: Learning Wellness: Healthy Ways to Respond To Stressful Student Life (NURS204), University of Washington, School of Nursing
- **2015**: Lifespan Development (BHS200), University of Washington, School of Nursing
- **2016**: Evidence Based Practice & Clinical Inquiry Winter (NURS403), University of Washington, School of Nursing
- **2017 - 2019**: Foundations of Evidence Based Practice (NURS6700), University of Utah, College of Nursing
- **2018 - 2019**: Program Planning, Management and Evaluation (NURS7525), University of Utah, College of Nursing
- **2019**: Application of Outcome Measures for Clinicians (NURS7700), University of Utah, College of Nursing

**Trainee Supervision**

**Graduate Students**

- **2018 - 2019**: Capstone Mentor, Ying Zhang, Bastyr University
  - Doctor of Acupuncture and Oriental Medicine Capstone: A Research Proposal of Electroacupuncture as an Adjunct Therapy in Treating Oxaliplatin-Induced Peripheral Neuropathy
- **2018 - 2019**: Special Project Advisor, Marsha Thomas-Robertson
  - Graduate Research project titled: Mindfulness and Acupuncture in the Context of Chronic Pain

**Undergraduate**

- **2018 - 2019**: Research Advisor, Morgan Arseneau, University of Utah. Undergraduate Research: Menopause Discussions on Social-Media
- **2018 - 2019**: Research Advisor, Rojin Karimanfard, University of Utah. Undergraduate Research: Menopause Discussions on Social-Media
- **2018 - 2019**: Thesis Faculty Supervisor, Annie Walton, University of Utah. Honors Senior Thesis: Sex Differences in Dispositional Mindfulness and its effect on Acupuncture Treatment Outcomes

**PEER-REVIEWED JOURNAL ARTICLES**


JOURNAL ARTICLES IN PROGRESS
3. Taylor-Swanson, L, Park, S., Squires, S., Lin, S.Y., Baker, M. & Voss, J. (in prep). Developing Mentoring Resources for PhD Students and Nursing Faculty on Campus-Wide Methods and Statistics Courses. To be submitted to Journal of Nursing Education.

BOOK CHAPTERS

PEER-REVIEWED ABSTRACTS
reasoning. Advances in Integrative Medicine, 6 Suppl. 1, s112.

UNPUBLISHED

PRESENTATIONS

SCIENTIFIC PRESENTATIONS

1996 Taylor, L. A Narrative Study of the Transition from Physical to Pretend Play. Poster, Society for Research in Child Development (SRCD), Washington DC.
1996 Taylor, L. A Frame Analysis of the Transition from Physical to Pretend Play. Poster, Rocky Mountain Psychological Association (RMPA), Park City, UT.
2009 Taylor-Swanson, L. A dynamic systems view and frame analysis of clinical reasoning in a traditional Chinese medicine clinic within the context of the patient-practitioner relationship. Podium presentation, North American Research Conference on Complementary & Integrative Medicine: Collaboration to Promote Scientific Discovery & Health, Minneapolis, MN.
2010 Taylor-Swanson L. Traditional Chinese Medicine is a Dynamic System of Medicine. Podium presentation. IN-CAM, Vancouver, Canada.
2011 Cassidy C, Taylor-Swanson L, Conboy L & Flesch H. The uses of qualitative research in advancing the acupuncture profession. Panel presentation. AAAOM, Bethesda, MD, USA.
2012 Neumann M & Taylor-Swanson L. Thermometer of warmth in the patient-provider relationship (WARMOMETER) – A short and easy to understand measure for use in integrative medicine (poster). IRCIMH, Portland, OR, USA.
2012 Woods N, Mitchell E, Cray L, Taylor-Swanson L, Ismail R, Thomas A. Symptom clusters during the menopausal transition and postmenopause: From identification to therapeutics (symposium). Western Institutes of Nursing, Portland, OR, USA.
2012 Neumann M & Taylor-Swanson L. Nursing applications for the WARMOMETER – A measurement of provider warmth (poster). Western Institutes of Nursing, Portland, OR, USA.
2012 Taylor-Swanson L Menopausal symptoms treated by Traditional East Asian Medicine –
Two case studies (podium presentation). Western Institutes of Nursing, Portland, OR, USA.

2013  
**Taylor-Swanson, L.** (poster). Systematic Review of Acupuncture for Geriatric Concerns. Elder Friendly Futures Conference, Seattle, WA, USA.

2013  
**Taylor-Swanson L**, Applications of Complex Adaptive Systems in Complementary and Integrative Medicine Research (symposium presentation and organizer). SCTPLS Portland, OR, USA.

2013  
Woods N, Mitchell E, Cray L, **Taylor-Swanson L**, Ismail R, Thomas A. Symptom clusters and therapeutics (symposium). Western Institutes of Nursing, Anaheim, CA, USA.

2013  
**Taylor-Swanson, L.** Developing sense of self in the context of chronic illness (podium presentation). Western Institutes of Nursing, Anaheim, CA, USA.

2014  
**Taylor-Swanson, L.** Self-awareness and Traditional East Asian Medicine. (Podium presentation) IN-CAM, Calgary, AB, Canada.

2014  

2014  

2014  
**Taylor-Swanson, L & Woods, NF.** Traditional East Asian Medicine Approaches to Identifying Symptom Clusters. (poster). Western Institutes of Nursing. Seattle, WA, USA.

2014  
**Taylor-Swanson, L** (poster). Systematic Review of Acupuncture for Geriatric Concerns. Western Institutes of Nursing. Seattle, WA, USA.

2015  

2015  
**Taylor-Swanson, L**, Pincus, D, Koithan, M, Conboy, L, Woods, N., Butner, J. & Wong, A. Seattle Midlife Women’s Health Study. On-site discussion and analyses of data. Group presentation at close of conference, Datapalooza, Orange, CA, USA.

2015  
**Taylor-Swanson, L**, Meins, A, Lin, SY, Price, C, Chow, C, Buckland, H, Bjornsen, K. PhD in Nursing Science for non-RNs: Opportunities, Challenges and Future Directions (podium presentation), Western Institute of Nursing, Albuquerque, NM, USA

2015  
**Taylor-Swanson, L**, Park, S, Lin, SY, Squires, S, Hien, HD, Lin, YT & Voss, J. Addressing gaps in a nursing research doctoral education program (podium presentation), Western Institute of Nursing, Albuquerque, NM, USA.

2016  
**Taylor-Swanson, L.** Assessing the Self-Consciousness Scale in a Sample of Midlife Women (podium presentation), Western Institute of Nursing, Disneyland, CA, USA.

2016  
**Taylor-Swanson, L.** Testing of a Model of Self-Awareness on Hot Flash Severity (podium presentation) Western Institute of Nursing, Disneyland, CA, USA.

2016  
**Taylor-Swanson, L.** Emerging Methodological Approaches for Integrative Nursing Science and Research (symposium presentation), Western Institute of Nursing, Disneyland, CA, USA.

2016  
**Taylor-Swanson, L.** Assessing the Self-Consciousness Scale in a Sample of Midlife Women, (poster) Western Institute of Nursing, Disneyland, CA, USA.

2017  
**Taylor-Swanson, L.** From Measurement to Model: Self-Awareness and Hot Flash Severity (symposium), Western Institute of Nursing, Denver, CO, USA.

2017  
**Taylor-Swanson, L.** Dynamics of Stress and Fatigue During the Menopausal transition, Early Postmenopause (symposium), Western Institute of Nursing, Denver, CO, USA.

2017  
**Taylor-Swanson, L.**, Stone, J. Acupuncture for Low Back Pain: A Systematic Review of Randomized Controlled Trials (poster), Society for Acupuncture Research, San Francisco, CA, USA.

2017  
**Taylor-Swanson, L.** Whole Systems of Traditional East Asian Medicine: A Multiple Case
2018 Neumann M & **Taylor-Swanson L.** Thermometer of warmth in the patient-provider relationship (WARMOMETER) – A short and easy to understand measure for use in integrative medicine (poster). IRCIMH, Portland, OR, USA.

2019 **Taylor-Swanson, L.** Stone, J, & Gale, M. Update on the Washington State Labor & Industries Policy (podium presentation). Society for Acupuncture Research, Burlington, VT, USA.


2019 Conboy, L, Pendavaris, & **Taylor-Swanson, L.** Utilizing TCM Cluster Theory to Analyze Ehlers-Danlos Syndrome – A Connective Tissue Disease (poster). Society for Acupuncture Research, Burlington, VT, USA.

2019 **Taylor-Swanson, L.** Arseneau, M, Karimanfard, R, & Simonsen, S. Midlife Women and Fatal Opioid Overdose, Sex and Gender in Women’s Health Research Conference, Salt Lake City, UT, USA.

2019 Arseneau, M, Karimanfard, R, & **Taylor-Swanson, L.** Social Media Discussions of #Menopause, Sex and Gender in Women’s Health Research Conference, Salt Lake City, UT, USA.

2019 **Taylor-Swanson, L.** White, S., Budhathoki, A. & Garland, E. Enhancing Interoceptive Awareness: Mindfulness and Acupuncture as a Combined Intervention for Chronic Pain (podium presentation). International Conference on Complementary Medical Research, Brisbane, Australia.

2019 **Taylor-Swanson, L.** Prasad, T, Jacobsen, E, & Conboy, L. Complexity in Licensed Acupuncturists’ Clinical Reasoning (podium presentation). International Conference on Complementary Medical Research, Brisbane, Australia.


2019 **Taylor-Swanson, L.** Prasad, T, Jacobsen, E, & Conboy, L. Complexity in Licensed Acupuncturists’ Clinical Reasoning (poster). International Conference on Complementary Medical Research, Brisbane, Australia.

2019 Arseneau, M, Karimanfard, R, & **Taylor-Swanson, L.** Social Media Discussions of #Menopause. Undergraduate Research Experience Conference, Salt Lake City, UT, USA.


**Community Presentations**

2006 **Introduction to acupuncture.** Three Trees Yoga & Healing Arts Center, Federal Way, WA

2006 **Chinese medicine at home.** Three Trees Yoga & Healing Arts Center, Federal Way, WA

2006 **Introduction to acupuncture.** Metro Parks, Tacoma, WA

2007 **Acupuncture & infertility.** Three Trees Yoga & Healing Arts Center, Federal Way, WA

2007 **Introduction to acupuncture.** Three Trees Yoga & Healing Arts Center, Federal Way, WA

2007 **Acupressure and yoga for stress – with Karen Schwisow – December.** Three Trees Yoga & Healing Arts Center, Federal Way, WA

2007 **Acupressure and yoga for stress – with Karen Schwisow – November.** Three Trees Yoga & Healing Arts Center, Federal Way, WA

2008 **The Treatment of Male- and Female-Factor Infertility with Traditional East Asian Medicine.** Marlene’s Market & Deli, Federal Way, WA
2008 Yin Yoga and Acupressure as Stress-Relieving Techniques at Home – with Janice Sack-Ory. Three Trees Yoga & Healing Arts Center, Federal Way, WA
2010 Morning and Evening Routines to Improve Health. Abundant Health, PLLC, Tacoma, WA
2010 Overview of Traditional Chinese Medicine. Pacific Lutheran University, Parkland, WA
2011 Introduction to acupuncture. Metro Parks, Tacoma, WA

COMMUNITY SERVICE
Conference Workshop Facilitator
2013 Elder Friendly Futures, Assistant to Facilitator of World Topics in Gerontology. Sept, 2013
2015 Breakfast and discussion co-organizer: Integrative Health, Western Institutes of Nursing, Albuquerque, NM, USA.

Guest Lectures
2012 Invited Lecturer, University of Washington, School of Nursing. Midwifery course. Judy Lazarus, MSN, CNM, ARNP, Instructor.
2013 Guest Lecturer, University of Washington, School of Nursing. Undergrad research course. Trez Buckland, PhD, instructor.
2013 Invited Lecturer, Seattle Institute of Oriental Medicine. Graduate Practice Management Course.
2014 Guest Lecturer, University of Washington, School of Nursing, Nurse Camp. Invited to lecture regarding acupressure for high school students’ self-care while attending Nurse Camp.
2015 Guest Lecturer, University of Washington, School of Nursing, Nurse Camp. Invited to lecture regarding acupressure for high school students’ self-care while attending Nurse Camp.
2017 Guest Lecturer, NURSE7773, Leadership & Health Policy, College of Nursing, University of Utah.
2018 Guest Lecturer, Bastyr University, Doctoral Program.
2018 Guest Lecturer, The Headache School, University of Utah, School of Medicine, Department of Neurology.
CAREER PLAN

Career Statement. My long-term career goal is to be an internationally recognized health sciences researcher integrating the fields of acupuncture research; pain perception, processing and evaluation; and women’s health. I would like to be an expert in the conduct of clinical trials of acupuncture for chronic pain, especially among midlife women. My first step is to evaluate the possible role of interoception (how we feel our bodily sensations, including pain) as a novel mechanism of action of acupuncture that could later be potentiated by combination with proven mindfulness interventions to develop an enhanced acupuncture intervention. My second step would then be to develop and test the interoception-optimized acupuncture intervention in a general population. Future work would then be to test the intervention with midlife women who, compared to men, are at higher risk for chronic pain, to be prescribed opioids at higher doses, for a longer duration, and experience rapidly increasing rates of fatal opioid overdose.

Career Goals and Objectives. As a PhD-prepared nurse-scientist and Licensed Acupuncturist, I conduct research examining the effect of acupuncture on chronic pain. I also have experience in midlife women’s health including the menopausal transition. The Vice President’s Clinical and Translational (VPCAT) Research Scholars Program will provide me with mentored support to meet my career goals as I develop expertise and engage in selected training activities including: (1) the safe and correct conduct of clinical trials; (2) enhanced understanding of, and ability to, objectively measure interoception; and (3) increased skills in leadership and research team management. These training activities build on my prior work regarding midlife women’s health, symptom experience, and evaluation. This includes my recent R21 submission to NIH regarding interoception, emotion regulation and acupuncture in the context of chronic pain (primary scientific mentor Dr. Julie M. Fritz is a Co-Investigator), and an ongoing pilot study designed to examine whether acupuncture plus mindfulness (“ACUMIND”) enhances interoception (scientific co-mentor Dr. Eric L. Garland is a Co-Investigator).

The American College of Physicians include acupuncture as a first-line intervention for the treatment of chronic pain. Demonstrated mechanisms of action of acupuncture include increased endogenous opioid peptide production, dopamine reuptake, and release of serotonin. However, changes in interoception have not yet been studied concerning acupuncture. I am pursuing this area of investigation because it is plausible (1) that acupuncture affects interoception and (2) that this effect could be further enhanced by a tailored acupuncture intervention. If so, the tailored acupuncture intervention may deliver even better pain analgesia. Given the devastatingly high rates of chronic pain in the United States, I would like to study interoception and later apply it to the topic of midlife women. Women notice bodily sensations more often and are more likely to experience pain compared to men. Consequently, women are medicated with opioids sooner and at higher levels than men. This research is both critical and significant because the prescription opioid fatal overdose rate among women aged 30-64 years increased 485% during 1999-2017 and increased >1000% among women aged 55-64 years specifically. As an emerging expert on midlife women’s health and as an acupuncture clinician with nearly two decades experience, I am uniquely poised to conduct this research. Anticipated deliverables during the two-year VPCAT mentoring period include manuscripts, national and international presentations on ACUMIND primary outcomes and functional magnetic resonance imaging (fMRI) results with respect to cortical processing of interoception pre/post a series of acupuncture treatments; and a K01 submission to National Center for Complementary & Integrative Health (NCCIH) based on this VPCAT application topic.

While I have experience leading small teams on my intramural awards, to successfully lead larger teams on a national level, I need additional leadership and team management skills. I have the unique opportunity to learn from Drs. Julie M. Fritz and Eric L. Garland who both lead national teams, collaborate already, and are willing to mentor me for the VPCAT award. Further, the VPCAT award will provide me an opportunity to expand my understanding of the conduct of clinical trials and develop an objective measure of interoception during the 2-year VPCAT Training.

My mentors and I have developed this Career Development Plan to achieve the Training Goals:

Training Goal 1: Gain a foundation in the conduct of clinical trials.

Rationale: To develop training in the conduct of clinical trials.

Related to: Specific Aim 1 (conducting a randomized controlled trial).

Coursework: NIH Introduction to the Principles and Practice of Clinical Research (IPPCR) online certificate trains registrants on how to safely and effectively conduct clinical research. UU Research Administrative
Training Series (RATS) course Investigator Orientation: Responsible Conduct of Research Series will familiarize me with federal regulations, professional standards and University of Utah policies regarding research integrity and responsibilities.

**Practical Experience:** Guided by Dr. Fritz, I will complete online IPPCR coursework via NIH and RATS.

**Mentoring:** One-on-one meetings with Dr. Fritz twice per month will supplement the online coursework so I may discuss questions as they emerge with Dr. Fritz.

### Training Goal 2: Increase understanding and learn objective measurement of interoception.

**Rationale:** Develop a model explicating the physiologic mechanisms and objectively measure interoception. I will work with Dr. Eric L. Garland and Dr. Sahib Khalsa who is an international expert on interoception to study interoception in more depth. Dr. Khalsa has already agreed to work with Dr. Garland and me in this regard.

**Related to:** Specific Aim 2 (measuring interoception).

**Practical Experience:** I will meet with Dr. Eric L. Garland and Dr. Sahib Khalsa via Skype to develop an acupuncture-relevant measurement of skin interoception. I will also develop skills using the technology required for these measures as well as accurate data capture, cleaning, and analysis.

**Mentoring:** I will meet once per month for an hour with Dr. Garland to discuss assigned readings regarding interoception and one meeting per quarter will take place with Dr. Fritz.

### Training Goal 3: Develop scientific management and leadership skills

**Rationale:** To develop additional leadership and team management skills to succeed as a national leader in acupuncture research.

**Related to:** Long-term career goal of leading multidisciplinary teams that will ultimately develop enhanced acupuncture interventions designed to decrease chronic pain and deaths due to opioid overdose and to improve outcomes among midlife women with chronic pain.

**Coursework:** MDCRC 6340 – Team Communication and Collaboration for Translational Research; Health Sciences Faculty Leadership and Early Career Women Faculty Leadership Development Seminars.

**Practical Experience:** I will attend Dr. Fritz’s research meetings to observe the conduct of large, multidisciplinary research projects. Dr. Fritz currently leads two multi-site, multi-disciplinary clinical trials investigating treatments for pain. One is NIH-funded and one is PCORI-funded. She leads monthly research leadership team meetings for these projects. I will attend as appropriate to observe the management of large clinical trials.

**Mentoring:** Twice-monthly one-on-one meetings with Dr. Fritz will supplement coursework and one meeting per quarter will take place with Dr. Garland.

This plan is summarized in the schedule and timeline on Table 1.

### Table 1. Training Goals, Research Activities, and Publications/Grant Submission Timeline

<table>
<thead>
<tr>
<th>Activity</th>
<th>Type of Activity</th>
<th>Year of Award</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Training Goal 1:</strong> Gain a foundation in the conduct of clinical trials Mentor: Dr. Julie M. Fritz</td>
<td>Online Certificate</td>
<td>1, 2</td>
</tr>
<tr>
<td>NIH Introduction to the Principles and Practice of Clinical Research (IPPCR)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RATS training. Investigator Orientation: Responsible Conduct of Research</td>
<td>Formal coursework</td>
<td>1</td>
</tr>
<tr>
<td>MDCRC 6040 Design of Clinical Trials</td>
<td>Formal coursework</td>
<td>2</td>
</tr>
<tr>
<td><strong>Training Goal 2:</strong> Increase understanding and learn objective measurement of interoception Mentor: Dr. Eric L. Garland</td>
<td>Informal study</td>
<td>1</td>
</tr>
<tr>
<td>Directed readings on interoception led by Dr. Eric L. Garland</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skype with Dr. Sahib Khalsa and Dr. Eric L. Garland</td>
<td>Informal training</td>
<td>2</td>
</tr>
<tr>
<td><strong>Training Goal 3:</strong> Hone scientific management and leadership skills Mentors: Dr. Julie M. Fritz &amp; Dr. Eric L. Garland</td>
<td>Formal coursework</td>
<td>1</td>
</tr>
<tr>
<td>MDCRC 6340 – Team Communication and Collaboration for Translational Research</td>
<td>Seminar</td>
<td>2</td>
</tr>
<tr>
<td>Health Sciences Faculty Leadership II and III Seminar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Early Career Women Faculty Leadership Development Seminar</td>
<td>Seminar</td>
<td>2</td>
</tr>
<tr>
<td>Attend Dr. Julie Fritz’s research team meetings for ongoing multi-site clinical trials for pain. Discuss leadership questions with Dr. Garland.</td>
<td>Informal mentoring</td>
<td>1, 2</td>
</tr>
<tr>
<td><strong>Publications and Grant Submissions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Publication of ACUMIND pilot study outcomes</td>
<td>Publication</td>
<td>1</td>
</tr>
<tr>
<td>Publication of fMRI and Interoception pilot study data</td>
<td>Publication</td>
<td>2</td>
</tr>
<tr>
<td>Submission of K01 to NCCIH</td>
<td>Grant submission</td>
<td>1</td>
</tr>
</tbody>
</table>

**SCIENTIFIC MENTORING PLAN**

**Primary Scientific Mentor:** Dr. Julie M. Fritz is an Associate Dean for Research, College of Health, and Distinguished Professor, Physical Therapy & Athletic Training at the University of Utah. She is an experienced...
mentor and has supported new investigators’ growth to independence. Many of Dr. Fritz’s former pre- and post-doctoral trainees have gone on to successful independent research careers in pain management often leading clinical trials. She will guide the overall execution of my research and career development aims and provide specific mentoring concerning Training Goals 1 and 3 and Specific Aim 2. I will meet with Dr. Fritz during our regularly scheduled twice monthly one-on-one meetings that focus on my career development, grantsmanship skill development, and national collaborations. I will also attend Dr. Fritz’s research study meetings one or more times per month. Dr. Fritz is ideally suited to mentor me as she has experience leading clinical trials of spinal manipulative therapy for the treatment of chronic low back pain. She is leading or has lead studies funded by PCORI, NIH/NCCIH, AHRQ and Department of Defense-funded studies totaling over $15M. Dr. Fritz is a Co-Investigator on a R21 application I previously submitted as PI to NCCIH in June 2019 titled “Investigating Interoceptive Awareness and Emotion Regulation in the Context of Acupuncture for the Treatment of Chronic Low Back Pain.” Dr. Fritz participated in the development, refinement, and preparation of the grant application. We are also writing a manuscript in conjunction with Dr. Eric L. Garland titled “Midlife Women’s Experience of Chronic Pain and the Role of Interoceptive Awareness” (submission to Women’s Midlife Health, October 2019). Dr. Julie M. Fritz and Dr. Eric L. Garland currently collaborate on a PCORI-funded grant titled Optimizing Treatment Sequencing for Patients with Chronic, Non-Specific Low Back Pain that includes spinal manipulative therapy and mindfulness. It is ideal for them to jointly mentor me because of their existing collaboration and shared expertise in clinical trial and execution for interventions targeting pain.

**Scientific Co-Mentor:** Dr. Eric L. Garland is a Distinguished Endowed Chair in Research, Professor and Associate Dean for Research College of Social Work; Director, Center on Mindfulness and Integrative Health Intervention Development (C-MIIND); and Associate Director of Integrative medicine – Supportive Oncology, Huntsman Cancer Institute (HCI) at the University of Utah. Dr. Garland has a track record of successfully guiding new investigators to independence. Many of Dr. Garlands’ former pre- and post-doctoral trainees have gone on to successful independent research careers and often leading clinical trials. Dr. Garland will advise me on aspects of symptom experience and symptom evaluation, most specifically the role of interoception, as well as the design and execution of clinical trials of Integrative Health interventions. We will meet every month and discuss articles on interoception as he is a content expert on this topic. Dr. Garland will also review my grant applications as he has significant expertise and success in grantsmanship including over $40M in funding. Dr. Garland will mentor me regarding Training Goals 1 and 2 and Specific Aims 1 and 2. He has mentored me this past 18 months and we work well together. We are currently collaborating on a pilot study examining acupuncture and mindfulness (ACUMIND) in the context of chronic pain, and writing two manuscripts: (1) a data-based manuscript on the effect of distorted interoception on opioid misuse disorder, and (2) a conceptual paper on the role of interoception in pain experienced by midlife women with Dr. Fritz.

**Mentoring Plan**

**Bi-Weekly Progress Updates:** Every other week updates will be emailed to Drs. Fritz and Garland. Each update will seek input on ongoing research related to the VPCAT Research Scholars Program with the specific aim of receiving input from my mentoring team.

**Twice-Monthly Primary Scientific Mentor Sessions:** Dr. Fritz and I will meet twice monthly on campus to cover all completed progress on data analyses, manuscript development and writing, project outline, grant mechanism identification updates, and deadline updates. I will prepare an agenda in advance noting any questions I seek to address during the meeting, review progress on stated goals, and update each mentor with my upcoming goals and projects.

**Every Month Scientific Co-Mentor Sessions:** I will meet with Dr. Garland once each month. I will prepare an agenda in advance noting any questions I seek to address during the meeting, review progress on stated goals, and update each mentor with my upcoming goals and projects. We will also discuss an assigned reading on interoception at each meeting.

**Deadline Meetings:** All meetings will be scheduled to accommodate an October 2020 K01 submission, with email correspondence aiding in the writing and editing process of the K01 grant.

**Plans to Monitor and Evaluate Progress:** Drs. Fritz and Garland will jointly oversee my career and scientific milestones and we will meet together quarterly. Quantifiable outcomes include successful completion of formal coursework and informal training, manuscript submissions and conference presentations, and submission of a K-award grant proposal. I will submit all VPCAT reports on-time and according to VPCAT requirements.
RESEARCH PLAN

Specific Aims

Acupuncture is an evidence-based intervention for chronic musculoskeletal pain with moderate effect sizes. Clinical practice guidelines from the American College of Physicians include acupuncture as a first-line intervention for the treatment of chronic pain, including chronic low back pain (CLBP). Several physiologic mechanisms of acupuncture action relevant to chronic pain have been identified including increased endogenous opioid peptide production, dopamine reuptake, and the release of serotonin. An as-yet unexplored mechanism of acupuncture action is the experience and appraisal of chronic pain – termed pain cognition. Pain cognition is affected by an individual’s psychological and emotional condition, such as anxiety, depression, perceived life-control, and emotion regulation. More negative pain cognition is associated with increased chronic pain intensity. Recent work has identified a possible role for interoception in chronic pain cognition. Interoception is a component of pain cognition and is defined as the awareness of internal sensations such as heartbeat, satiety, as well as autonomic nervous system activity related to emotions. Given that CLBP is the second most common cause of disability in the United States, the most prevalent pain condition, and is costly, it is urgent to develop and test interventions to improve CLBP.

Accordingly, interoception and emotion regulation have been studied as a mechanism of action of mind-body interventions used to treat pain, such as Mindful Awareness in Body-Oriented Therapy and mindfulness. Increased levels of interoception are associated with adaptive emotion regulation. Problematically, maladaptive emotion regulation might be a risk factor for the development of chronic pain. However, acupuncture has yet to be studied regarding interoception and emotion regulation. Therefore, given the gap in knowledge regarding the possible effect of acupuncture on interoception and emotion regulation and NCCIH’s priority to develop and test treatments for pain, a long-term goal of this research is to discover if interoception and emotion regulation are increased by acupuncture. If so, focusing on this mechanism of action could yield more effective methods of using acupuncture to treat CLBP.

Using a randomized repeated measures design, we will compare an acupuncture group (n=30 participants) to those who receive an attention control (n=30 participants). We selected an attention control as research suggests that the clinical interaction and attention may account for some of the patient response to acupuncture treatment.

Specific Aim 1: Develop an objective acupuncture-relevant measure of interoceptive accuracy.

Aim 1a: Create an objective measurement of interoceptive accuracy involving activated neural components distributed in the skin, muscle, and connective tissues surrounding the inserted acupuncture needle. The design and testing of an objective measure will be completed in conjunction with consultants who are experts in interoception and nervous system processing of interoceptive information.

Specific Aim 2: Examine the effects of 10 acupuncture sessions on interoception and emotion regulation compared to attention control and explore relationships between interoception, emotion regulation, and pain severity.

Aim 2a: Examine change over time in interoception and emotion regulation in response to acupuncture. Hypothesis: Interoception and emotion regulation scores will be significantly increased in the acupuncture group compared to attention control.

Aim 2b: Explore relationships between interoception, emotion regulation, and pain severity. Hypothesis: There will be a greater difference in scores of interoception, emotion regulation, and pain severity on treatment days than control days in the acupuncture group compared to attention control.

Impact: This study will create an innovative objective acupuncture-relevant measure of interoception and also generate the first data on the roles interoception and emotion regulation may play in pain cognition in the context of acupuncture treatment compared to attention control. If acupuncture improves pain cognition through the mechanism of improving interoception and emotion regulation, future development of a tailored acupuncture intervention to further increase interoception and emotion regulation could have a major effect on reducing CLBP. Eventually, this will decrease costs and disability associated with CLBP, and reduce mortality as enhanced acupuncture treatment could be tested against opioid therapy for CLBP.
Current & Previous Research Efforts

Pre- and post-doctoral training: During my predoctoral training, I examined the role of self-awareness (a concept related to interoception) on perceived hot flash severity in a secondary data analysis. I also participated in two systematic review projects examining acupuncture efficacy with my mentor Dr. Nancy Fugate Woods. My postdoctoral work exposed me to Clinical Informatics and I conducted a review of Complementary & Integrative Health website content.

Current Position Productivity: I have initiated two pilot projects since joining the CON faculty in July 2017. These projects forward my program of research on acupuncture and interoception with a randomized study of acupuncture and mindfulness (2019: $25,000, intramural-CON, funded) and a study of acupuncture for peripheral neuropathy pain with subjective measures of interoception and objective fMRI to examine interoception centers in the brain (2018: $20,000 intramural-CON; $17,000 matching, funded). I have written and submitted as PI two additional grants in the last academic year: *Nonlinear Datapalooza 2.0* ($5,000, intramural-VPR, funded); *Non-linear Datapalooza 2.0* (intramural-CON, funded, $3,000).

As evidenced by my predoctoral and postdoctoral work, high levels of productivity have been attained. I received a recent international award from the Society for Acupuncture Research; have two pilot studies underway; and have demonstrated a solid publication record; consistent grantsmanship productivity; and symposium, podium, and poster presentations at local, national and international conferences. My research productivity includes the following peer-reviewed publications focused on acupuncture (five publications, two are first-author), interoception (one first-author manuscript in prep with Drs. Fritz and Garland) the role of self-awareness on symptom perception (first author), women’s health (nine publications, three are first-author) and opioids (one published manuscript, one first-author data-based manuscript in preparation). This is relevant given my two current pilot projects on acupuncture and my plans to test acupuncture as an intervention for pain and other symptoms experienced by midlife women taking opioids. I have delivered over 40 conference presentations, including invited presentations, symposia, podium presentations, and posters. I have gained experience in a variety of roles including Principal Investigator (PI), Co-Investigator, and Consultant. I have learned how to lead investigations, successfully conducting research and generating publications. My accomplishments indicate potential with impact as a fundable independent investigator. I can generate innovative ideas, identify interdisciplinary collaborators, lead collaborations, and disseminate findings.

Future Research Plans

Research undertaken during my participation in the VPCAT program will build upon my prior and current work on acupuncture and interoception specifically the context of women’s experience of chronic pain. Pain and mechanism of action research remain priority areas for NCCIH. My research into interoception as a possible mechanism of action in alignment with this mission, as would subsequent projects to trial acupuncture for chronic pain experienced by women taking prescribed opioids. NCCIH offers K01 funding, for which I would be eligible. I will work with my VPCAT mentors and with feedback from VPCAT committee members to submit a K01 application for funding in October 2020 (PA-18-369, Mentored Research Scientist Development Award (Parent K01 - Independent Clinical Trial Not Allowed)). This project will develop an objective acupuncture-relevant measurement of interoception, and evaluate 2) test whether acupuncture increases interoception effects and emotion regulation, and 3) evaluate whether changes in interoception and ER are associated with decreased pain severity. A Funding Opportunity Announcement from NCCIH regarding mechanistic studies would be a natural next step [RFA-NS-18-043, Discovery and Validation of Novel Targets for Safe and Effective Pain Treatment (R01 Clinical Trial Not Allowed)]. The goal would be to investigate interoception as an underlying mechanism of action to optimize the acupuncture intervention. A subsequent R01 application would be submitted to test the optimized acupuncture intervention in a fully powered clinical efficacy trial using PA-19-055, Research Project Grant (Parent R01 Clinical Trial Required).
References


September 23, 2019

RE: Letter Scientific Mentor Letter for Dr. Lisa Taylor-Swanson for the Vice President’s Clinical and Translational Scholars’ Program

Dear Vice President’s Clinical and Translational Research Scholar Program Review Committee:

I strongly recommend Dr. Lisa Taylor-Swanson for the Vice President’s Clinical & Translational Research Scholars (VPCAT) Program. I am excited to continue my work with Dr. Taylor-Swanson around our shared scientific interest and will enthusiastically serve as her primary scientific mentor. I have worked closely with Dr. Taylor-Swanson as she has prepared her VPCAT application. I am the Associate Dean for Research and a Distinguished Professor in the College of Health, Department of Physical Therapy & Athletic Training. My research program has been extramurally funded for the past 19 years from NIH, PCORI, Department of Defense and other agencies foundations. I have been awarded over $15M in extramural funds including my current PCORI-funded study of two common first-line treatments for chronic low back pain (Dr. Eric Garland, Dr. Taylor-Swanson’s scientific co-mentor is a Co-Investigator on this study), and a Department of Defense, CDMRP-funded study of physical therapy for knee pain. In addition, I have successfully mentored 12 pre-doctoral and 2 postdoctoral trainees. I am currently mentoring 3 pre-doctoral trainees who are working on my funded projects. In addition, I have mentored numerous junior faculty in my role as the Associate Dean for Research in the College of Health, and as a mentor in the VPCAT and U HELM programs.

<table>
<thead>
<tr>
<th>Selected Past Mentees</th>
<th>Training period</th>
<th>Research Area/project</th>
<th>Current Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steven George, PhD, PT</td>
<td>2000 – 2004</td>
<td>The Effect of a Fear Avoidance Based Intervention for Patients with Acute Low Back Pain. A Randomized Clinical Trial</td>
<td>Professor and Director of Musculoskeletal Research, Duke Clinical Research Institute, Vice Chair of Clinical Research, Department of Orthopaedic Surgery, Duke University</td>
</tr>
<tr>
<td>Jeff Hebert, PhD, DC</td>
<td>2006-2010</td>
<td>A randomised clinical trial comparing the effects of two exercise programmes on clinical outcome and lumbar multifidus muscle function</td>
<td>CCRF/New Brunswick Health Research Foundation Research Chair in Musculoskeletal Health, University of New Brunswick</td>
</tr>
<tr>
<td>Jake Magel, PhD, PT</td>
<td>2008-2011</td>
<td>The Influence of Psychosocial Variables on Treatment Outcomes, Expectations and Costs in Acute Low Back Pain</td>
<td>Research Assistant Professor, Department of Physical Therapy &amp; Athletic Training, University of Utah</td>
</tr>
<tr>
<td>Anne Thackeray, PhD, PT</td>
<td>2010-2013</td>
<td>The influence of leg pain on recovery after acute low back pain and subsequent treatment choices.</td>
<td>Research Assistant Professor, Department of Physical Therapy &amp; Athletic Training, University of Utah</td>
</tr>
</tbody>
</table>
Given my long established history of mentoring and consistent track record of extramural funding, and my past work as a VPCAT mentor, I recognize the potential of Dr. Taylor-Swanson to transition into a successful investigator with a sustained funded program of research. I will provide Dr. Taylor-Swanson with one-on-one mentoring, an opportunity to attend my research team meetings for ongoing multi-site clinical trials on pain management, and I will continue to provide my feedback on her manuscripts and grant applications.

I have already begun informally mentoring Dr. Taylor-Swanson for about 9 months. She and I submitted an R21 application to NCCIH in June 2019 titled Interoceptive Awareness and Emotion Regulation in the Context of Acupuncture for the Treatment of Chronic Low Back Pain. Dr. Taylor-Swanson is the PI and I am a co-Investigator on this R21 application. This proposal is awaiting review. Dr. Taylor-Swanson and I are also in the process of submitting for peer review a manuscript titled *Midlife Women’s Evaluation of Pain: The Role of Interoceptive Awareness in Pain Cognition*. Thus far, during the grant proposal and manuscript writing/submission processes, I have observed Dr. Taylor-Swanson to be a leader, an active contributor to scientific discussion and I am impressed with her insightful contributions. Dr. Taylor-Swanson’s program of research dovetails nicely with my own research that involves clinical trials investigating various non-pharmacologic treatments for pain conditions including chronic low back pain. I am strategically poised to advise Dr. Taylor-Swanson regarding the rigorous execution of clinical trials and I can provide expert guidance on the topic of chronic pain.

A review of Dr. Taylor-Swanson’s work to-date reflects her potential for research productivity and independence. Since she became an Assistant Professor at the College of Nursing in July, 2017, she has published 9 peer-reviewed papers (6 are data-based, 6 are first-author) and 3 peer-reviewed abstracts, received 3 intramural grants, received 1 grant from VPR, is PI on a R21 in review with NIH/NCCIH, is a Co-Investigator on a R21 in review with NIH/NINR, received a research award from an international organization, delivered 15 scientific presentations, and mentored 3 undergraduate students and 2 graduate students. Prior to her arrival at Utah, she published 7 peer-reviewed articles (5 are data-based, 2 are first author), 4 non peer-reviewed papers, 1 book chapter, 3 peer-reviewed abstracts, 1 unpublished dissertation, 1 unpublished honors senior thesis, and delivered 30 scientific presentations.

Dr. Taylor-Swanson has communicated to me her passion for women’s health. Her dissertation work identified a gap in the research related to the role of self-awareness (a concept related to interoception) in symptom evaluation (severity, bother, interference). Her proposed work builds on this by studying the role of interoception in pain perception. Further, she intends to discover if interoception is a mutable mechanism of action. If this is the case, she will develop and test an enhanced acupuncture intervention to maximize the effect of interoception to decrease chronic pain. She will then test this intervention for midlife women taking prescribed opioids for chronic pain. First, she must study interoception in a general context before applying it specifically to midlife women in the context of opioid medications. This is a well thought-out research progression that will help her to be successful in the near- and long-term.
One of the most admirable traits I have observed in Dr. Taylor-Swanson is her ability to take constructive feedback and incorporate it into her research. Along with her high level of motivation, this is an essential trait to not only seek extramural funding for her research, but to remain diligent and persistent. Her current drive to seek extramural funding and ability to be mentored makes her well suited for the mission of the VPCAT award.

I have read the Scientific Mentor(s) Eligibility Determination Checklist and I will support Dr. Taylor-Swanson according to these responsibilities. I have current and prior experience as a VPCAT primary scientific mentor and VPCAT Senior Mentor, so I am very familiar with the mentor requirements and expectations. I will attend the initial, one-hour VPCAT mentoring team meeting with Dr. Taylor-Swanson, scientific co-mentor Dr. Eric Garland, and the VPCAT senior mentor and program staff at the start of the program. Dr. Barbara Wilson, Interim Dean of the College of Nursing, has ensured that Dr. Taylor-Swanson will have at least 30% FTE in protected time to the development of her career and research program during the two-year VPCAT program period. Dean Wilson has also agreed to prevent and/or address any issues of inadequate devoted time that may arise (see the institutional letter of commitment from Dean Wilson).

My mentoring philosophy is to assist mentees to clearly articulate their goals and objectives and provide assistance and accountability in working towards them. As a mentor for Dr. Taylor-Swanson I will meet face-to-face with her twice monthly for the two-year duration of the program. At these meetings, I will guide Dr. Taylor-Swanson in the completion of the required VPCAT Scholar Career development plan, help her establish her career and research goals and review her progress towards completing the objectives of the VPCAT program. I will advise Dr. Taylor-Swanson on key research questions, help to outline experimental design, provide critique and feedback on rough drafts of manuscripts and grant applications, and so forth. A key aspect of creating accountability to be certain that meetings have an agenda and items to be completed from the previous meeting are reviewed. I am committed to guiding Dr. Taylor-Swanson through the development and submission of extra- and intramural grant applications. Additionally, I will identify opportunities to support Dr. Taylor-Swanson’s growth through exploratory and pilot extramural funding announcements.

Dr. Taylor-Swanson has an accomplished scientific co-mentor, Dr. Eric Garland. Dr. Garland is a Professor and Associate Dean for Research and Distinguished Endowed Chair in Research, University of Utah College of Social Work. Dr. Garland will mentor Dr. Taylor-Swanson on the topics of conducting correct and safe clinical trials and interoception. Dr. Garland and I will meet together with Dr. Taylor-Swanson quarterly during the two years of the award. I have collaborated with Dr. Garland on several funded projects. At our meetings with Dr. Taylor-Swanson we will monitor research progress, career development, and grant and manuscript preparation. Dr. Taylor-Swanson is also working with Dr. Sahib Khalsa, Director of Clinical Studies, Laureate Institute for Brain Research, Assistant Professor, Oxley College of Health Sciences, University of Tulsa. Dr. Khalsa is an expert in interoception and he will work with Dr. Garland to assist Dr. Taylor-Swanson with the development and use of an objective measure of interoception (Training Goal 2).

Dr. Taylor-Swanson is a promising new investigator exploring a novel area of health. Leveraging the mentorship that VPCAT has to offer, I anticipate Dr. Taylor-Swanson will be a successful independently funded scientist. I overwhelming recommend her for this training award.

Sincerely;
September 22, 2019

Vice President’s Clinical and Translational Research Scholar Program
Office of Academic Affairs and Faculty Development
University of Utah School of Medicine

Re: Scientific Co-Mentor Letter of Commitment for Lisa Taylor-Swanson, PhD, MAcOM, LAc

Dear Vice President’s Clinical and Translational Research Scholar Program Review Committee:

I am pleased to recommend Dr. Lisa Taylor-Swanson for the VPCAT Program and to serve as a scientific co-mentor for this award. I have extensive experience serving as a mentor for graduate students and junior faculty, including in NIH grant development. My expertise lies in Dr. Taylor-Swanson’s area of focus: the role of interoceptive awareness in pain cognition. My successful track record in obtaining more than $50M in extramural funding, and experience as a mentor makes me qualified to serve as a VPCAT co-mentor to Dr. Taylor-Swanson. Further, I have read the required responsibilities outlined in the VPCAT Scientific Mentors Eligibility Determination Checklist and I will be supporting Dr. Taylor-Swanson according to these responsibilities. I have also assisted Dr. Taylor-Swanson with the preparation of her VPCAT application.

I have known Dr. Taylor-Swanson since she started her position as an Assistant Professor at the College of Nursing. She contacted me to discuss our shared interests in interoceptive awareness and Integrative Health interventions. She has a very clear vision of her program of research that includes rationale for K-level and R-level applications. Her program of research focuses on acupuncture for chronic pain and midlife women’s health. Her goals include the examination of interoceptive awareness as a mechanism of action of acupuncture and the later translation of this knowledge by developing acupuncture interventions that leverage the enhancement of interoception in order to decrease pain. She would like to eventually trial acupuncture for midlife women taking opioids for chronic pain.

Dr. Taylor-Swanson has been productive in establishing herself as a new research scientist. For example, she has published eight manuscripts since her arrival at the U two years ago, and two more under review. In addition, she has three College of Nursing intramural grants ($20,000, $20,000 and $3,000), and she received funding from the Vice President for Research’s office for a conference ($5,000) which she chairs: Nonlinear Datapalooza 2.0: A New Kind of Conference for a New Kind of Science. This cutting-edge conference will bring scholars from across the country to the U of U to engage in interdisciplinary data analysis onsite applying nonlinear methods and it is Dr. Taylor-Swanson who is bringing this innovative conference to our campus. Lastly, Dr. Taylor-Swanson’s 17 years of experience working as a Licensed Acupuncturist specializing in women’s health greatly informs her research. She has demonstrated independence, self-motivation and willingness to work in – and lead – team settings. I believe Dr. Taylor-Swanson is an excellent candidate for this career development award as a new researcher with extremely high potential.
Dr. Taylor-Swanson and I have been working together for two years. She previously interviewed participants for my R01- and DOD-funded trials of Mindfulness-Oriented Recovery Enhancement (MORE) for chronic pain and opioid related problems. She has become familiar with how I conduct clinical trials and has observed how I lead a large multidisciplinary lab as she aspires to do so in the future. We are currently collaborating on a pilot study of acupuncture and mindfulness (ACUMIND) at Huntsman Cancer Institute (HCI). She has successfully led this project that includes a team of Research Assistants and our colleagues at HCI. We anticipate this pilot project will provide preliminary data for a future NIH grant application. Additionally, We are presently working on two manuscripts together, titled *Interoceptive Awareness and Opioid use Disorder Associated with Pain Severity and Midlife Women’s Experience of Chronic Pain and the Role of Interoceptive Awareness* (a collaboration with Dr. Julie Fritz). Our current collaboration on projects indicates our shared research interests and our ability to work well with one another.

As Dr. Taylor-Swanson’s scientific co-mentor, I will meet with her for one hour per month throughout the 2-year award to advise her in the development of her research program. Specifically, I will provide guidance and review for her K01 submission planned for June 2020. I will also guide her in submitting at least two manuscripts related to the topic of interoceptive awareness and symptom experience to be submitted during the first year of the award. Dr. Taylor-Swanson will send a draft agenda prior to each meeting and will include any materials such as abstracts and drafts of manuscripts or grants. At each meeting, we will discuss her progress, troubleshoot issues, and identify next steps and timelines. I am committed to meeting together with Dr. Taylor-Swanson and her primary scientific mentor, Dr. Julie Fritz quarterly and with the VPCAT mentoring team as needed during the two-year program.

As chronic pain affects so many individuals, is a cause of debility and costs society a great deal, there is a great need for researchers who can integrate clinical backgrounds with expertise in the development and trialing of novel non-pharmacological interventions such as acupuncture. I believe Dr. Lisa Taylor-Swanson is ideally suited as a candidate for this award and I look forward to working with her.

Sincerely,

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Eric L. Garland, PhD, LCSW  
Distinguished Endowed Chair in Research  
Professor, University of Utah College of Social Work  
Director, Center on Mindfulness & Integrative Health Intervention Development  
Associate Director, Integrative Medicine & Supportive Oncology Program, Huntsman Cancer Institute  
Associate Editor, *Mindfulness*  
Salt Lake City, UT 84112  
Sept 26, 2019

Vice President’s Clinical and Translational Research Scholar Program
Office of Academic Affairs and Faculty Development
University of Utah School of Medicine

Dear Vice President’s Clinical and Translational Research Scholar Program Review Committee:

I am pleased to provide my enthusiastic support for the enclosed application to the Vice President’s Clinical and Translational (VPCAT) Research Scholar Program for Dr. Lisa Taylor-Swanson, PhD, MAcOM, LAc. As Interim Dean of the College of Nursing, I am committed to ensuring her success and she will be guaranteed a minimum of 30% protected time allocated for research, career development and scholarly activity required by the VPCAT program each year for the two-year duration of the award. Dr. Taylor-Swanson will have release time to attend the VPCAT orientation, leadership seminars and the monthly curricular sessions as noted in Table 1 below. Further, I am firmly committed to Dr. Taylor-Swanson’s program of research and I will personally advocate for her should anything go awry with her FTE allocation to research. In fact, she is presently allocated 52% FTE for research which reflects this strong commitment on the part of the College of Nursing to Dr. Taylor-Swanson (please refer to Table 2).

Table 1: Release Time Awarded to Dr. Taylor-Swanson for VPCAT Activities

<table>
<thead>
<tr>
<th>Approved release time for Dr. Taylor-Swanson:</th>
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<tbody>
<tr>
<td>Mandatory VPCAT Colloquium – Monday and Tuesday, December 2nd &amp; 3rd, 2019</td>
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<tr>
<td>Twice-monthly, ½ day curricular sessions (2nd &amp; 4th Wednesdays, 12:30 – 4:30)</td>
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<tr>
<td>Initial and subsequent meetings with her VPCAT Mentoring Team</td>
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<tr>
<td>Supplemental career opportunities, such as grant-writing workshops, leadership seminars, K-Club, etc.</td>
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</tbody>
</table>

Table 2: Dr. Taylor-Swanson’s FTE allocation

<table>
<thead>
<tr>
<th>Activity</th>
<th>FTE % (AY 2019-20, Totals 99%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Funded Scholarship (Research)</td>
<td>52% (VPCAT 30% subsumed in total FTE)</td>
</tr>
<tr>
<td>Teaching</td>
<td>37%</td>
</tr>
<tr>
<td>Service</td>
<td>10%</td>
</tr>
</tbody>
</table>

Dr. Taylor-Swanson is an emerging new investigator with great potential and has demonstrated commitment to clinical and translational research on the topic of acupuncture to treat chronic pain, and especially in the context of chronic pain treated with opioids. Her program of research is in alignment with the College of Nursing’s longstanding focus on symptom management which includes the treatment of chronic pain. As a talented pre-tenured assistant professor and Licensed Acupuncturist, Dr. Taylor-Swanson is committed to improving the care of individuals...
experiencing chronic pain, and most especially midlife women as they are the demographic with the greatest increase in fatal overdose rates among all ages and genders (both CDC and Utah data). She is particularly interested in elucidating a potential novel mechanism of action of acupuncture – altered interoceptive awareness – that could, if correct, later be potentiated in a tailored acupuncture intervention for pain. I am confident that, with the mentoring and support provided by the VPCAT program, her clinical experience, research aptitude, and innovative field of research promote a high likelihood of future funding.

Dr. Taylor-Swanson has carefully assembled an impressive team of scientists for her program of study. Her scientific mentor is Dr. Julie Fritz, Distinguished Professor and Associate Dean for Research in the College of Health, with expertise in chronic pain as well as clinical trial design and execution. Dr. Fritz has met regularly with Dr. Taylor-Swanson during the current academic year and is a Co-Investigator on a R21 Dr. Taylor-Swanson submitted to NIH’s center, NCCIH in June, 2019. Additionally, Drs. Fritz and Taylor-Swanson are currently in the process of submitting for peer review a conceptual paper on the role of interoceptive awareness on pain cognition. Dr. Taylor Swanson’s scientific co-mentor is Dr. Eric Garland. Drs. Taylor-Swanson and Garland are currently collecting pilot data on an intervention they have jointly created – combined acupuncture and mindfulness to treat chronic pain, called ACUMIND. Additionally, they have a data-based manuscript in review on distorted interoceptive awareness among individuals with chronic pain who are misusing opioids. Dr. Garland is a Presidential Scholar, Professor and Associate Dean for Research in the University of Utah College of Social Work. He is the Director of the Center on Mindfulness and Integrative Health Intervention Development, and the Associate Director of Integrative Medicine in Supportive Oncology at Huntsman Cancer Institute. He also has an impressive track record of NIH funding and will provide mentoring on interoceptive awareness and grantsmanship.

Dr. Taylor-Swanson will also have access to secondary mentors, full support of the College of Nursing and the considerable resources within our Emma Eccles Jones Nursing Research Center (EEJNRC) during the award period. The EEJNRC provides pre- and post-award support, literature searches, methodology consultation, data management, and statistical analysis support. Additionally, Dr. Taylor-Swanson was hired with a generous start up package including research development funds. She also has the opportunity four times per year to apply for College of Nursing intramural grants that range from $3,000 to $30,000.

Dr. Taylor-Swanson has a private office equipped with a computer workstation including two high definition widescreen monitors, and a webcam with integrated microphone. Software on the workstation includes: Office 2013, Adobe Creative Suite, EndNote, UBox, Skype for Business, and SPSS. At home or while traveling, Dr. Taylor-Swanson will be able to remotely and securely access all files and materials stored on University of Utah servers using a VPN connection. All systems are between one and three years old and currently run on MS Windows 10 operating systems in the College of Nursing. The College of Nursing has four full-time and one part-time information technology staff available for troubleshooting computer issues.
Dr. Taylor-Swanson has successfully attained competitive College of Nursing intramural funding on symptom management, particularly neuropathic pain and chronic pain. She is investigating the role of interoceptive awareness in both types of pain and is developing the ACUMIND intervention with Dr. Garland. Additionally, she co-leads regular College of Nursing Research Innovation Team meetings focused on women’s health. Dr. Taylor-Swanson also regularly attends laboratory meetings of both Drs. Fritz and Garland in order to gain leadership and clinical trial expertise.

These experiences provide Dr. Taylor-Swanson the necessary education and skills to accomplish her goal of developing a strong program of research. Her many years as a clinician specializing in symptom management also enhance the relevant technical and clinical skills needed to develop a research program. This research program will examine novel mechanisms of action of acupuncture – namely interoceptive awareness – in order to develop and test an enhanced acupuncture intervention for chronic pain experienced by individuals taking prescribed opioid medications.

I want to express my full support for Dr. Taylor-Swanson’s research and emphasize my commitment to her innovative approach to address the gap in our scientific knowledge about the possible role of interoceptive awareness as a mechanism of action and how to improve outcomes for individuals taking opioids for chronic pain. Her research has great potential for extramural funding and for making a positive impact in the health of our nation.

Sincerely,

Barbara Wilson, PhD, RN
Interim Dean and Associate Professor
Associate Dean for Academic Programs
University of Utah College of Nursing
BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. DO NOT EXCEED FIVE PAGES.

NAME: Fritz, Julie

eRA COMMONS USER NAME (credential, e.g., agency login): juliefritz

POSITION TITLE: Distinguished Professor, Department of Physical Therapy & Athletic Training, Associate Dean for Research, College of Health, University of Utah

EDUCATION/TRAINING

<table>
<thead>
<tr>
<th>INSTITUTION AND LOCATION</th>
<th>DEGREE (if applicable)</th>
<th>Completion Date MM/YYYY</th>
<th>FIELD OF STUDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hope College, Holland, Michigan</td>
<td>BS</td>
<td>05/1990</td>
<td>Biology/Phys. Education</td>
</tr>
<tr>
<td>University of Indianapolis, Indianapolis, Indiana</td>
<td>MS</td>
<td>12/1992</td>
<td>Physical Therapy</td>
</tr>
<tr>
<td>University of Pittsburgh, Pittsburgh, Pennsylvania</td>
<td>PhD</td>
<td>07/1998</td>
<td>Rehabilitation Science</td>
</tr>
</tbody>
</table>

A. Personal Statement

The goal of this proposal is to explore relationships between interoceptive awareness, emotion regulation as possible mechanisms by which acupuncture decreases chronic low back pain (CLBP). I am excited to collaborate with Dr. Taylor-Swanson and her team on this project. I have already begun informally mentoring Dr. Taylor-Swanson for about 9 months. She and I submitted an R21 application to NCCIH in June 2019 titled Interoceptive Awareness and Emotion Regulation in the Context of Acupuncture for the Treatment of Chronic Low Back Pain. Dr. Taylor-Swanson is the PI and I am a co-Investigator on this R21 application. This proposal is awaiting review.

Dr. Taylor-Swanson and I are also in the process of submitting for peer review a manuscript titled Midlife Women’s Evaluation of Pain: The Role of Interoceptive Awareness in Pain Cognition. My role as Primary Scientific Mentor is focused on the second aim and the design and execution of the randomized exploratory clinical trial. I have extensive experience and expertise conducting research to determine mechanisms of action of non-pharmacological interventions for CLBP, which makes me well-qualified to assist Dr. Taylor-Swanson and the team in this aspect of the project. Further, I have successfully mentored 12 pre-doctoral and 2 postdoctoral trainees. I am currently mentoring 3 pre-doctoral trainees who are working on my funded projects. In addition, I have mentored numerous junior faculty in my role as the Associate Dean for Research in the College of Health, and as a mentor in the VPCAT and UHELM programs.

I have worked extensively with interdisciplinary teams within health systems to conduct clinical trials that drew upon prior mechanistic work. This work has included rigorous clinical trials published in high impact journals. My research has engaged interdisciplinary teams of rehabilitation providers and therapists, physicians, behavioral health specialists, informaticists, biostatisticians, health care economists. My research has been continuously funded by federal agencies since 2008. My experience and training in clinical research and my expertise in evaluating mechanisms of action of non-pharmacologic interventions makes me well-suited to contribute on this project.

B. Positions and Honors

Positions and Employment

<table>
<thead>
<tr>
<th>Year</th>
<th>Position/Department</th>
</tr>
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<tbody>
<tr>
<td>1993-1994</td>
<td>Physical Therapist, Healthsouth Sports Medicine, Birmingham, Alabama</td>
</tr>
<tr>
<td>1994-1995</td>
<td>Physical Therapist, University of Pittsburgh Medical Center, Center for Sports Medicine and Rehabilitation, Pittsburgh, Pennsylvania</td>
</tr>
<tr>
<td>1995-1997</td>
<td>Graduate Student Assistant, Department of Physical Therapy, School of Health and Rehabilitation Sciences, University of Pittsburgh, Pittsburgh, Pennsylvania</td>
</tr>
<tr>
<td>1997-1998</td>
<td>Research Associate, Department of Physical Therapy, University of Pittsburgh</td>
</tr>
<tr>
<td>1998-2003</td>
<td>Assistant Professor, Department of Physical Therapy, University of Pittsburgh</td>
</tr>
</tbody>
</table>
2004-2006  Assistant Professor, Division of Physical Therapy, University of Utah, Salt Lake City, UT
2004-2013  Clinical Outcomes Research Scientist, Intermountain Healthcare, Salt Lake City, UT
2006-2012  Associate Professor, Department of Physical Therapy, University of Utah, Salt Lake City, UT
2012-2016  Professor, Department of Physical Therapy, University of Utah, Salt Lake City, UT
2014-  Associate Dean for Research, College of Health, University of Utah, Salt Lake City, UT
2016-  Distinguished Professor, Department of Physical Therapy, University of Utah, Salt Lake City, UT

Other Experience and Professional Memberships
2001-  Editor, *Journal of Orthopaedic and Sports Physical Therapy*
2006-  Editorial Board Member, *European Spine Journal*
2007-  Advisory Board Member, Cochrane Collaboration Back Review Group
2009  Invited Participant, NIH Workshop: Non-Pharmacologic Management of Back Pain, National Institutes of Health, Rockville, MD
2010  Invited Participant, Workshop on Deconstructing Back Pain, sponsored by the National Center for Complementary and Alternative Medicine (NCCAM) National Institutes of Health
2010  Member, World Health Organization’s International Classification of Functioning, Disability and Health (ICF) Core Set Development Conference for Vocational Rehabilitation, Nottwil, Switzerland
2011-  Member, Scientific Review Committee, Foundation for Physical Therapy
2012  Member, Burden of Musculoskeletal Disease Steering Committee, sponsored by the United States Bone and Joint Initiative
2012-  ad hoc reviewer, Health Service Organization and Delivery (HSOD), Musculoskeletal Rehabilitation Sciences (MRS) and ZAT VS (11), National Center for Complementary and Integrative Health study sections.
2013  Member, Patient-Centered Outcomes Research Institute (PCORI) Back Pain Working Group
2013-  Member, Dissemination and Implementation Research in Health Study Section, Center for Scientific Review, National Institutes of Health
2016  Participant, Training Institute in Dissemination and Implementation Research (TIDIRH) sponsored by the National Institutes of Health

Honors
2003-2004  Rose Excellence in Research Award, awarded by the Orthopaedic Section of American Physical Therapy Association
2006-2007  Physical Therapy Association
2007  The University of Utah, College of Health, Senior Researcher Award
2009  Jules M. Rothstein Golden Pen Award for Scientific Writing, awarded by the American Physical Therapy Association
2010  Marian Williams Award for Research in Physical Therapy, awarded by the American Physical Therapy Association
2014  Catherine Worthingham Fellow, awarded by the American Physical Therapy Association
2014  Richard W. Bowling - Richard E. Erhard Orthopedic Clinical Practice Award, awarded by the Orthopedic Section, American Physical Therapy Association

C. Contributions to Science
1. A consistent theme of my research has focused on conducting rigorous clinical trials evaluating the efficacy and effectiveness of physical therapy treatments. I have served as a Principal Investigator or a Co-Investigator for several randomized clinical trials that have been published in high quality scientific journals. Several of these trials have been largely pragmatic in nature and designed with scalability and implementation in mind. Many of these publications have informed clinical practice guidelines and systematic reviews. Several of these studies have been recognized by the American Physical Therapy Association with various awards acknowledging their substantial contribution to the scientific basis underlying the clinical practice of the profession.


2. An important aspect of my research has involved the use of large datasets of clinical and claims electronic health records data for analysis of care delivery patterns and outcomes. This line of health services research has focused largely on identifying predictors of important outcomes using multi-variate models and strategies to manage concerns for confounding in observational research (e.g., propensity score matching, etc.). Several of these studies have used data resources from University of Utah Health and the electronic data warehouse maintained by the University of Utah.


3. Another important aspect of my research has leveraged electronic health records data and focused on the impact of early care decisions and sequences of decisions on downstream health care costs and outcomes. One important outcome included in this research is long-term opioid use. Early care variables examined in this body of research has included imaging (e.g., radiographs, MRI, etc.), consultations and referrals (e.g., physical therapy, specialist physicians, etc.) and prescribing of opioid and non-opioid medications.


Finally, I have contributed to the literature identifying phenotypes of patients with musculoskeletal pain conditions in an effort to improve clinical decision-making and optimize outcomes of physical therapy. At the time of much this work there was little scientific basis to guide decision-making by physical therapists about which treatments are most likely to benefit which types of patients. The result of these studies was to define sub-groups of patients based on patterns of clinical findings who were likely to respond to particular physical therapy interventions. This body of work provided critical background information to inform future clinical trials examining treatment efficacy and effectiveness.


Complete List of Published Work in MyBibliography:

D. Research Support
Ongoing Research Support
OTS-LBP-2017C1-6486 Fritz (PI) 08/01/18-02/28/24
Patient-Centered Outcomes Research Institute (PCORI)
Optimizing treatment sequencing for patients with chronic, non-specific low back pain
This project will use a sequential multiple randomization trial design to compare the effectiveness of two common first-line treatments for patients with chronic LBP (physical Therapy and CBT). Patients who are non-responders to initial treatment will be re-randomized to a second treatment strategy of either switching to the other first-line option or mindfulness. Role: PI

NIH/NCCIH 1UH3AT009763-01 Fritz/Rhon (MPI) 09/01/19-08/31/23
SMART LBP Care in Military Health System
The overall goal of this project is to improve pain management for chronic LBP in the Military Health System. Our strategy is to better integrate the biopsychosocial model and improve Stepped Care management. The UH3 phase of this phased award using a Sequential Multiple Randomization Trial to compare effectiveness and cost-effectiveness of Step 1 and 2 pain care options, examining sequencing, and heterogeneity of effects in pre-specified subgroups. Role: PI

W81XWH-17-DMRP-CRMRP-NMSIRRA Rhon (PI) 09/01/18-08/31/21
Congressionally Directed Medical Research Program (CDMRP)
Impact of Evidence-Based Nonsurgical Management Guidelines on Outcomes for Disabling Knee Injuries: Long-Term Health Deficits, Disability, and Economic Analysis.
This project will compare 2-year outcomes between two different non-surgical approaches to managing knee osteoarthritis, where all patients will receive care based on the DoD/VA Guidelines for Management of Knee OA, and a second group will also receive an evidence-based physical therapy program. Role: Co-I

OPD-1601-33860 Zgierska (PI) 07/01/16-06/30/20
Patient-Centered Outcomes Research Institute (PCORI)
A Comparative Effectiveness Randomized Controlled Trial of Mindfulness Meditation versus Cognitive Behavioral Therapy for Opioid-Treated Chronic Low Back Pain
This project will compare the effectiveness of MM vs. CBT in opioid-treated chronic low back pain. Outcomes will be examined over a 12-month follow-up period using patient-centered outcomes as well as qualitative interviews with patients and family members. Role: Utah Sub-Award Co-Investigator

1UH3AT009293-01 Fritz (PI) 08/01/16-07/31/19
NIH/NCCIH
Optimization of Spinal Manipulative Therapy (SMT) Protocols
Our overall goal in this proposal is to optimize SMT treatment protocols for patients with low back pain. The optimization strategy will evaluate SMT combined with other treatments known to modulate the same signals that underlie the clinical effects of SMT assessing both mechanistic (stiffness, lumbar multifidus activation) and patient-centered (function and pain) outcomes. Role: PI

Completed Research Support
1UG3AT009763-01 Fritz & Rhon (PIs) 10/01/17-09/30/19
NIH/NCCIH
SMART LBP Care in Military Health System
The overall goal of this project is to improve pain management for chronic LBP in the Military Health System. Our strategy is to better integrate the biopsychosocial model and improve Stepped Care management. The project has two Phases: 1) Planning Phase to establish procedures study interventions and data collection and management, and 2) Demonstration Phase using a Sequential Multiple Randomization Trial to compare effectiveness and cost-effectiveness of Step 1 and 2 pain care options, examining sequencing, and heterogeneity of effects in pre-specified subgroups. Role: PI

1R18HS022641-01 Fritz (PI) 09/04/14-08/31/19 (NCE)
AHRQ
Management Strategies for Patients with Low back Pain and Sciatica
The major goals of this randomized trial are to compare the effectiveness and costs associated with adding physical therapy to primary care management during the first 4 weeks of care for patients with LBP and sciatica. Outcomes are assessed across a 1-year follow-up and include measures of disability, pain, satisfaction, healthcare utilization and costs. Role: PI

NIH/NICHD ReACT Center Pilot Award Magel (PI) 05/01/17-04/30/18
Development of a Cognitive Reassurance Training Program on Physical Therapist and Patient Outcomes
The goal of this pilot project is to develop and evaluate a training program in cognitive reassurance (CR) provided to outpatient physical therapists. Outcomes of training include changes in physical therapists’ confidence and knowledge about cognitive reassurance and the fidelity with which they provide cognitive reassurance to patients managed under routine clinical circumstances. Role: Co-I

Health Service Pilot Grant Fritz (MPI) 07/01/15-06/30/17
Center on Health Services Training and Research Associations Between Continuity of Care and Future LBP-related Utilization and Costs in Patients with Low Back Pain
The goal of this study is to use Utah’s All Payer Claims Database (APCD) to examine the influence of physical therapy continuity of care on healthcare utilization and cost outcomes in patients referred to physical therapy by a primary care provider. Role: MPI
BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors. Follow this format for each person. DO NOT EXCEED FIVE PAGES.

NAME: Eric L. Garland, PhD

eRA COMMONS USER NAME (credential, e.g., agency login): ELGARLAND

POSITION TITLE: Professor, Distinguished Endowed Chair in Research

EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)

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<th>INSTITUTION AND LOCATION</th>
<th>DEGREE (if applicable)</th>
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<th>FIELD OF STUDY</th>
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<td>University of Delaware, Newark, DE</td>
<td>BA</td>
<td>05/98</td>
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<td>West Virginia University, Morgantown, WV</td>
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<td>University of North Carolina, Chapel Hill, NC</td>
<td>Post-Doc</td>
<td>06/10</td>
<td>Integrative Medicine</td>
</tr>
</tbody>
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A. Personal Statement

The goal of this proposal is to explore relationships between emotion regulation, interoceptive awareness, and to develop an objective measure for interoception that would identify interoception as a possible mechanism by which acupuncture decreases chronic low back pain (CLBP). I am looking forward to collaborating with Dr. Taylor-Swanson and her team on this project and my role relates to Specific Aim 1 and the development of an objective acupuncture-relevant measurement of interoception. I am pleased to recommend Dr. Lisa Taylor-Swanson for the VPCAT Program and to serve as a scientific co-mentor for this award. I have extensive experience serving as a mentor for graduate students and junior faculty, including in NIH grant development. My expertise lies in Dr. Taylor-Swanson's area of focus: the role of interoceptive awareness in pain cognition. My successful track record in obtaining more than $50M in extramural funding, and experience as a mentor makes me qualified to serve as a VPCAT co-mentor to Dr. Taylor-Swanson.

I am Distinguished Endowed Chair in Research, Professor and Associate Dean for Research in the University of Utah College of Social Work, Director of the Center on Mindfulness and Integrative Health Intervention Development, and Associate Director of Integrative Medicine in Supportive Oncology at Huntsman Cancer Institute. I have formal training in intervention research, psychophysiology, and integrative medicine. The goal of my research agenda is to translate findings from cognitive and affective neuroscience into the development of interventions that effectively target transdiagnostic mechanisms underpinning addiction, emotion dysregulation, and chronic pain. In that regard, I am the developer of Mindfulness-Oriented Recovery Enhancement (MORE), a novel behavioral therapy that integrates training in mindfulness, reappraisal, and amplification of natural reward processing to ameliorate addiction and its comorbidities. My mechanistic research program is focused on attention, automaticity, appraisal, and chronic pain, as well as in advanced biostatistical analyses of clinical trial outcomes, ecological momentary assessments (EMA), and biobehavioral mediators and moderators. To complement my expertise in clinical research, I am a licensed psychotherapist (LCSW) with over 15 years of clinical experience working with patients suffering from a wide range of substance use disorders, mood disorders, and chronic pain conditions. I have provided cognitive-behavioral therapy and mindfulness-based therapy for these patients in various mental health and integrative medicine settings.

B. Positions and Honors

Positions and Employment

| 2003-2010 | Psychotherapist, Asheville, NC and Chapel Hill, NC |
| 2008-2010 | Fellow, Integrative Medicine, University of North Carolina, Chapel Hill, NC |
2010-2013  Assistant Professor, College of Social Work, Florida State University, Tallahassee, FL
2013-present  Associate Professor, College of Social Work, University of Utah, Salt Lake City, UT
2013-present  Associate Director, Integrative Medicine, Huntsman Cancer Institute, Salt Lake City, UT
2015-present  Associate Dean for Research, College of Social Work, University of Utah, Salt Lake City, UT
2017-present  Professor, College of Social Work, University of Utah, Salt Lake City, UT
2017-present  Director, Center on Mindfulness and Integrative Health Intervention Development, SLC, UT

Other Experience and Professional Memberships
2005-present  Licensed Clinical Social Worker
2009-present  Editorial Board, Health and Social Work
2012-2018  Editorial Board, Journal of Behavioral Medicine
2013-present  Associate Editor, Mindfulness
2015-present  Editorial Board, Annals of Behavioral Medicine
2017-2019  Editorial Board, Pain Medicine
2019-present  Editorial Board, Experimental and Clinical Psychopharmacology
2015  Reviewer. SRG ZAT1 SM. NIH-NCCIH
2016  Reviewer. Interventions to Prevent and Treat Addiction (IPTA) SRG. NIH-NIDA
2017-2019  Chair, Research Working Group, Academic Consortium of Integrative Medicine & Health
2019  Reviewer. Multi-site Clinical Trials. ZDA1 AXI-R (07) S. NIH-NIDA.
2019-present  NIH HEAL Multi-disciplinary Working Group Member


Honors
2009  Received Ph.D. with distinction
2011  National Outstanding Dissertation Award, Society for Social Work and Research
2015  Presidential Scholar Award, University of Utah
2016-present  Fellow, Society for Social Work and Research
2019-present  Fellow, American Academy of Social Work and Social Welfare

C. Contributions to Science

1. Behavioral and Integrative Treatment Development Research. A primary focus of my research program has been on translating findings from cognitive and affective neuroscience into the development of behavioral interventions that effectively target transdiagnostic mechanisms underpinning addiction, affective dysregulation, and chronic pain. To that end, I developed an innovative, multimodal mindfulness-based intervention founded on insights derived from basic biobehavioral science, called Mindfulness-Oriented Recovery Enhancement (MORE). MORE is a mental training program that unites complementary aspects of mindfulness training, “third wave” cognitive-behavioral therapy, and positive psychological principles into an integrative treatment strategy for addiction. I have tested MORE in multiple federally-funded RCTs for individuals with substance use disorders (including alcohol dependence, prescription opioid misuse, and illicit drug dependence) and comorbid psychopathology or chronic pain conditions. Results from these trials demonstrated that MORE significantly reduces craving, drug misuse, and stress symptoms (as well as pain severity and functional impairment). Subsequent mechanistic studies indicated that participation in MORE was associated with significant reductions in attentional bias for emotionally-threatening cues, significant improvements in autonomic regulation during attention to emotional information, and significant increases in cardiac and electrocortical indices of natural reward processing. Further, MORE appears to exert addiction-specific effects, including significantly reducing drug cue-reactivity and decreasing the correlation strength between drug craving and addictive behavior. Taken together, MORE’s therapeutic effects on transdiagnostic mechanisms and addiction-specific targets suggest its therapeutic promise. Findings from this line of treatment development research have informed and been infused by a theoretical model I developed to delineate how MORE treats addiction by targeting hedonic dysregulation. This model posits that MORE restructures reward processes by strengthening top-down prefrontal regulation of bottom-up limbic and striatal mechanisms hijacked during the allostatic process of addiction. As an extension of my interest in behavioral treatment development, recently I tested the efficacy of two brief mind-body therapies in the hospital setting and found that these highly disseminable mind-body techniques reduce acute pain and desire for opioids.


2. Neurocognitive and Neuroaffective Mechanisms of Opioid Addiction and Chronic Pain Syndromes. A secondary focus of my research program is on targeting the neurocognitive mechanisms undergirding the downward spiral of chronic pain and prescription opioid addiction. To that end, my colleagues and I published a theoretical model delineating cognitive, affective, and neuro-psychopharmacologic pathways linking chronic pain to opioid addiction. In brief, the downward spiral linking chronic pain to opioid misuse and addiction involves a cycle of behavioral escalation in which nociception triggers pain hypervigilance and catastrophizing, amplifying pain with emotional anguish. Among affectively dysregulated individuals, opioid use in response to pain and negative emotions results in associative learning processes that bias attention towards opioid-related cues, strengthening the automatic habit of opioid use. Chronic pain and prolonged opioid misuse causes allostatic changes to stress and reward circuitry in the brain, increasing sensitivity to pain and decreasing the pleasure derived from healthful objects and events, leading to opioid dose escalation as a means of obtaining hedonic equilibrium. This downward spiral ultimately results in loss of control over opioid use – the hallmark of addiction. Empirical tests of this model revealed the first evidence in the scientific literature for (A) an opioid attentional bias among prescription opioid misusers, (B) dysregulated associative learning among opioid misusers, and (C) opioid misuse-related deficits in emotion regulation and natural reward processing.


3. Developing Cognitive and Autonomic Predictors of Clinical Outcome for Translation into Clinical Settings. A tertiary focus on my research program is to develop valid and reliable predictors of treatment outcome using neuroscience methods that ultimately may be translated and imported into clinical settings. This work began with my research on alcohol dependent patients, which found that alcohol attentional bias and autonomic indices of cue-reactivity predicted relapse up to 6 months following treatment. Subsequently, we demonstrated the predictive validity of opioid attentional bias and behavioral preference for drug versus natural rewards. We have also characterized dispositional mindfulness as a protective factor for addiction recovery that is linked with autonomic regulation of opioid-cue reactivity and reduced craving. As an extension of this work into the domain of affective dysregulation, I recently completed a DOD-funded study of implicit cognitive predictors of suicide risk, which builds upon my model of biobehavioral targets in the treatment of psychopathology.

4. Enhancing Natural Reward Processing as a Treatment for Addiction. Recently, my research program has begun to focus on testing the hypothesis that cognitive training in natural reward processing may remediate the allostatic dysregulation of brain reward circuitry that underpins addictive behavior, anhedonia, and chronic pain. In a series of studies on the therapeutic mechanisms of MORE, my colleagues and I found that using mindfulness to savor pleasant everyday experiences appeared to enhance neurophysiological indices of natural reward responsiveness which were in turn associated with significant reductions in opioid craving. Further, we found that MORE upregulated autonomic responses to natural reward cues relative to drug cues, that in turn predicted decreases in opioid misuse following treatment. To elucidate these findings, I have advanced conceptual frameworks that model temporally dynamic, causal linkages between mindfulness, hedonic regulation, and addiction. This work may represent my most important contribution to science to date.


**Effects of Mindfulness-Oriented Intervention on Endogenous Opioid Mechanisms of Hedonic Regulation in Chronic Pain**

The primary aim of this project is to examine effects of Mindfulness-Oriented Recovery Enhancement on opioidergic mechanisms during pain challenge and reward processing in opioid-treated chronic pain patients.

PR151790; Department of Defense
Role: **Principal Investigator**

**Targeting Chronic Pain and Co-Occurring Disorders with Mindfulness-Oriented Recovery Enhancement**

The primary aim of this project is to conduct a pragmatic, full-scale RCT of Mindfulness-Oriented Recovery Enhancement for Veterans and active duty service members with comorbid pain, opioid misuse, and distress.

OPD-1601-33860; Patient Centered Outcomes Research Institute
Role: **Utah Principal Investigator**

**A Comparative Effectiveness Randomized Controlled Trial of Mindfulness Meditation versus Cognitive Behavioral Therapy for Opioid-Treated Low Back Pain**

This is a comparative effectiveness trial of mindfulness vs. CBT for opioid-treated low back pain.

UG3AT009763-01
National Center for Complementary and Integrative Health
Role: **Co-Investigator**

**SMART Stepped Care Management for Low Back Pain in Military Health System**

The primary aim of this study is to use a Sequential Multiple Randomization Trial (SMART) to compare effectiveness and cost-effectiveness of a range of integrative pain care treatment sequences.

R21AT010109-01
National Center for Complementary and Integrative Health
Role: **Co-Investigator**

**Mindfulness-Oriented Recovery Enhancement as an Adjunct to Methadone Treatment for Opioid Use and Chronic Pain Management**

The primary aim of this project is to pilot test the effects of Mindfulness-Oriented Recovery Enhancement on relapse to opioid use and pain among individuals receiving medication assisted treatment for OUD.

**Completed Research Support**

R34DA037005; National Institute on Drug Abuse
Role: **Principal Investigator**

**Targeting Military Opioid Misuse with Mindfulness-Oriented Recovery Enhancement**

The primary aim of this project is to conduct a pilot RCT of Mindfulness-Oriented Recovery Enhancement as an intervention for soldiers with chronic pain who are at risk for prescription opioid misuse and addiction.