

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: Anne M. Bryden

eRA COMMONS USER NAME (credential, e.g., agency login): ANNEBRYDEN, Case Western Reserve University
 POSITION TITLE: Director of Clinical Trials and 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.*)

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Cleveland State University, Cleveland, OH	B.S.	1991	Occupational Therapy
Case Western Reserve University, Cleveland, OH	M.A.	2017	Sociology
Case Western Reserve University, Cleveland, OH	Ph.D.	pending	Sociology

A. Personal Statement

I have over 20 years of experience working with individuals with paralysis. My current role has evolved from my initial training as a certified and licensed Occupational Therapist. Having a strong interest in health care research led me to pursue a position with The Cleveland FES Center early in my career. My initial duties within the Center involved providing occupational therapy treatment to people with high level spinal cord injury (SCI) as they participated in a trial evaluating the efficacy and outcomes following implantation of an upper extremity neuroprosthesis. From that early foundation I have grown my career by taking the lead in analyzing data, publishing manuscripts and developing projects based on my assessment of the clinical needs of people with spinal cord injury. I am deeply committed to improving the lives of people with spinal cord injury. I have developed a strong network of colleagues internationally who share this commitment and have been responsible for many presentations and workshops at national and international conferences. I am a frequent reviewer of manuscripts related to rehabilitation and research for peer-reviewed journals such as Spinal Cord, Archives of Physical Medicine and Rehabilitation and Topics in Spinal Cord Injury Rehabilitation. Recognizing the need to sharpen my leadership skills, I applied to the Women Staff Leadership Development Initiative (WSLDI) Program offered by Case Western Reserve University. I was chosen as one of 12 women of the 2011-2012 cohort, completing the Women in Leadership Certificate through the Flora Stone Mather Center for Women and the Weatherhead School of Management. In May of 2015 I was awarded the Neilsen Foundation Allied Health Professional Research Award of ASIA, to develop a manualized assessment for measuring lower motor neuron damage in the upper extremities of people with cervical level SCI.

As a doctoral candidate in Sociology at Case Western Reserve University, I am interested in the utility of human rights discourse to frame the barriers and limitations experienced by people with disabilities in attaining services and technology to improve quality of life. My dissertation work is focused on examining the perspectives of health professionals on human rights and the experiences of individuals with SCI as they navigate multiple institutions and bureaucracies in the process of seeking necessary health and social resources.

B. Positions and Honors

Director of Clinical Trials and Research

May 2017 - Present

Institute for Functional Restoration / Case Western Reserve University
Cleveland, Ohio 44106

Graduate Student Appreciation Award
Case Western Reserve University College of Arts and Sciences – May 2018

Medicine, Society and Culture Travel Award
Case Western Reserve University Department of Bioethics – May 2017

Academy of Spinal Cord Injury Professionals *Therapy Leadership Council*
Distinguished Clinical Award – September 2015

Neilsen Foundation Allied Health Professional Award of ASIA
May 2015

Case Western Reserve University Weatherhead School of Management
Women in Leadership Certificate – June 2012

Case Western Reserve University
Women Staff Leadership Development Initiative – Class of 2011-2012

Research Manager March 2011 – May 2017
Case Western Reserve University / The Cleveland FES Center
Cleveland, Ohio 44106

Clinical Rehabilitation Specialist July 2004 – February 2011
Case Western Reserve University / The Cleveland FES Center
Cleveland, Ohio 44106

Research Health Science Specialist February 1993 – July 2004
Department of Veterans Affairs / The Cleveland FES Center
Cleveland, Ohio 44106

Occupational Therapist July 1991 - February 1993
Saint Vincent Charity Hospital & Health Center
Cleveland, Ohio 44115

Professional Memberships

American Academy of Spinal Cord Injury Professionals
American Spinal Injury Association
International Spinal Cord Society
American Occupational Therapy Association
American Sociological Association

C. Contributions to Science

1. Investigation of Human Rights, Disability and Technology

Historical Background As an occupational therapist and sociologist I am interested in the utility of human rights discourse to frame the barriers and limitations experienced by people with disabilities in attaining services and technology to improve quality of life. An important element is identifying economic, social and cultural rights for people with disabilities, rights that are frequently overlooked in mainstream discussions of human rights. Another element concerns the perspectives of health professionals with whom people with disabilities interact.

Health professionals rarely speak the language of human rights, yet often express frustration at the socio-structural limitations in providing quality care and the barriers experienced by their patients. I am currently conducting qualitative research supported by the Science and Human Rights Coalition of the American Association for the Advancement of Science investigating perspectives of health professionals specializing in SCI medicine regarding the barriers faced by the people they treat and whether invoking international human rights law can have a positive impact on their quality of life. I am also conducting longitudinal interviews with people living with SCI about the barriers experienced while navigating both health and social resources following their injury. Central Findings Initial results indicate 1) significant knowledge about and concern for social barriers experienced by people with SCI, 2) reduced knowledge about human rights discourse and potential utility in realizing economic, social and cultural rights for people with SCI, and 3) strong interest in learning more about international human rights law as a tool for improving access to services and technology by people with SCI. Early interviews with people living with SCI indicate significant difficulty in finding clear cut information about resources for living independently in the community, including in-home attendant care, returning to work, and access to research and technology that can provide greater independence. Application of Findings Documenting how people with disability navigate resources (including gaps and barriers) and measuring the human rights perspectives of health professionals can better inform how international human rights law may influence increased realization of the resources needed by people with disabilities for societal integration. Role I am the lead investigator for both projects, including conducting the interviews and analysis.

Human Rights Perspective on Tetrahand Rehabilitation and Technology. Invited lecture at the Tetrahand Congress 2018: The 12th International Congress on Surgery and Rehabilitation of the Upper Extremity in Tetraplegia; August 28-31, 2018 in Nottwil, Switzerland.

Human Rights, Technology, and Disabilities: The Right to Benefit from Scientific Progress. Thematic Groups session "Sociological Perspectives on Economic and Social Rights" XIX ISA World Congress of Sociology; July 15-21, 2018 in Toronto, Canada.

Human Rights, Technology, and Disabilities. Anne Bryden and Brian Gran. In preparation for submission to Human Rights Quarterly. Targeted for submission July 2018.

Human Rights and Access to Technology by People with Spinal Cord Injury. Panel session, Anne M. Bryden, Brian Gran, Kimberly D. Anderson-Erisman, Jennifer French and Megan Moynahan. 2018 Annual Meeting of The American Spinal Injury Association. Rochester, MN. 5/2/2018.

Implanted Neuroprosthetics, Innovative Upper Limb Evaluation and the Human Rights of People with Tetraplegia to Benefit from Technology. Invited lecture at the Shirley Ryan Ability Lab. Chicago, IL. 10/9/2017. (<http://planitpurple.northwestern.edu/event/521839>)

Human Rights, Technology, and Disabilities. Disability and Social Life session. Anne M. Bryden. 2017 Annual Meeting of the American Sociological Association. Montreal, Quebec, Canada. 8/14/2017.

2. Assessment of Functional Outcomes Following Innovative Interventions to Restore Function after Spinal Cord Injury (SCI)

Historical Background I have more than twenty years of experience measuring the impact of innovative interventions such as functional electrical stimulation (FES) neuroprosthetic systems and tendon transfer surgery in people with tetraplegia. These interventions impact multiple domains such as physiological functioning, activity performance and community participation requiring specialized knowledge in measuring their effects. Central Findings Neuroprosthetic systems and tendon transfers provide people with SCI more independence in performing activities of daily living in both their personal environments and out in the community. Participant satisfaction levels after these interventions are high. Application of Findings Neuroprosthetics and tendon transfer procedures provide function that is not otherwise attainable for this highly disabled population. Careful assessment of outcomes is critical to detect improvements and justify wider implementation of these interventions. Role I lead the functional assessment program for upper extremity neuroprosthetics and tendon transfers at The Cleveland FES Center. It is my responsibility to choose and implement the appropriate functional measures to detect outcomes.

- Bryden AM, Bezruczko N. An Activity of Daily Living Measure for Spinal Cord Injury. *Journal of Applied Measurement* 12(3):279-297, 2011
- Bryden AM, Kilgore KL, Keith MW, Peckham PH. Assessing Activity of Daily Living Performance after Implantation of an Upper Extremity Neuroprosthesis. *Topics in Spinal Cord Injury Rehabilitation* 14(3):37-53, 2008.
- Bryden AM, Kilgore KL, Kirsch RF, Memberg WD, Peckham PH, Keith MW. An Implanted Neuroprosthesis for High Tetraplegia. *Topics in Spinal Cord Injury Rehabilitation* 2005;10(3)38-52.
- Bryden AM, Wuolle KS, Murray PK and Peckham PH. The Utilization and Perceived Outcomes of Upper Extremity Surgical Reconstruction in Persons with Tetraplegia at Model Spinal Cord Injury Systems. *2004 Spinal Cord* 42:169-176.
- Wuolle KS, Bryden AM, Peckham PH, Murray PK and Keith MW. Satisfaction with Upper Extremity Surgery in Individuals with Tetraplegia. *Arch Phys Med Rehabil* 2003 84(8):1145-9.
- Peckham PH, Kilgore KL, Keith MW, Bryden AM, Bhadra N, Montague FW. An Advanced Neuroprosthesis for Restoration of Hand and Upper Arm Control Using an Implantable Controller. *J Hand Surg [Am]* 2002 Mar;27(2):265-76
- Bryden AM, Memberg WD and Crago PE. Functional and Physiological Evaluation of Electrically Stimulated Elbow Extension in Persons with C5 / C6 Tetraplegia. *Arch Phys Med Rehabil* 2000;81:80-88.
- Wuolle KS, Van Doren CL, Bryden AM, Peckham PH, Keith MW, Kilgore KL and Grill JH. Satisfaction and Usage of a Hand Neuroprosthesis. *Arch Phys Med Rehabil* 1999;80:206-13.
- Kilgore KL, Peckham HP, Keith MW, Thrope GB, Wuolle KS, Bryden AM, and Hart RL. "An Implanted Upper Extremity Neuroprosthesis: Follow up of Five Patients". *J Bone Joint Surg* 1997; 79A: 533-41

3. Establishing Clinical Assessment Standards for Upper Limb Management in Tetraplegia

Historical Background In my experience leading the measurement of functional outcomes of neuroprosthetic systems and other interventions, I have collaborated with other national and international experts in SCI rehabilitation. These collaborations have allowed me to contribute to the development of national and international clinical standards for upper limb management in tetraplegia. Central Findings I have contributed to book chapters and journal articles focused on assessment and treatment of upper limb dysfunction, including the International SCI Upper Extremity Basic Data Set. I am currently developing a manualized assessment of lower motor neuron damage that can be implemented by therapy clinicians, and have been invited to teach the process at two rehabilitation centers in Canada. Application of Findings Standardized assessments contribute to a shared language across clinicians and improve the overall assessment and care of people with SCI. The ability to detect lower motor neuron damage in people with SCI allows more targeted and appropriate intervention and identifies potential risks for additional dysfunction from problems such as contracture. Role I lead the effort to improve and refine existing outcome measures for tetraplegia. I also lead the effort to make lower motor neuron testing a standard of care by educating clinicians and participating in national and international work groups focused on rehabilitation outcomes measurement.

- Bryden AM, Kilgore KL, Nemunaitis GA. Advanced Assessment of the Upper Limb in Tetraplegia: A Three Tiered Approach to Characterizing Paralysis. *Topics in Spinal Cord Injury Rehabilitation* 2018;24(3)206-216.
- Bryden AM, Hoyen HA, Keith MW, Mejia M, Kilgore KL, Nemunaitis GA. Upper Extremity Assessment in Tetraplegia: The Importance of Differentiating between Upper and Lower Motor Neuron Paralysis. *Arch Phys Med Rehabil*. 97(6 Suppl 2):S97-104, 2016.
- Bryden AM, Kilgore KL, Lind BB and Yu DT. Triceps Denervation as a Predictor of Elbow Flexion Contractures in C5 and C6 Tetraplegia. *Arch Phys Med Rehabil* 2004;85(11)1880-1885.
- Mulcahey MJ, Betz RR, Bryden A, Calhoun C, LaVelle W, Schmidt-Read M, Stiefbold G. Orthotics. In: Harvinder Singh Chhabra (ed). *ISCoS Textbook on Comprehensive Management of Spinal Cord Injury*. Wolters Kluwer:New Delhi, Chapter 36, pp. 558-579.
- Bryden AM, Peljovich AE, Hoyen HA, Nemunaitis G, Kilgore KL, Keith MW. Surgical Restoration of Arm and Hand Function in People with Tetraplegia. *Topics In Spinal Cord Injury Rehabilitation* 18(1):43-49, 2012.
- Biering-Sorensen F, Bryden AM, Curt A, Friden J, Harvey LA, Mulcahey MJ, Popovic MR, Prochazka A, Sinnott KA, Snoek G. International Spinal Cord Injury Upper Extremity Basic Data Set. *Spinal Cord*, Advance Online:1-6, 2014.

Bryden AM, Sinnott KA, Mulcahey MJ. Innovative Strategies for Improving Upper Extremity Function in Tetraplegia and Considerations in Measuring Functional Outcomes. Topics in Spinal Cord Injury Rehabilitation 2005;10(4)75-93.

Dunn JA, Sinnott KA, Bryden AM, Connolly SJ, Rothwell AG. Measurement Issues Related to Upper Limb Interventions in Persons Who Have Tetraplegia. Hand Clin 24:161–168, 2008.

Peljovich AE, Bryden AM, Malone K, Hoyen HA, Hernandez-Gonzalez E, Keith MW. Rehabilitation of the Hand and Upper Extremity in Tetraplegia. In: Skirven TM, Osterman AL, Fedorczyk JM, Amadio PC, eds. Rehabilitation of the Hand and Upper Extremity. 6th ed. Philadelphia, PA:Elsevier Mosby; 2011.

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D. Additional Information: Research Support and/or Scholastic Performance

ACTIVE

Title: “Phase 2 Study of a Networked Neuroprosthesis for Grasp, Reach, and Trunk Function in Cervical Spinal Cord Injury” R01-FD-005409

Commitment: 0.6 Calendar-months

Funding Agency: FDA Orphan Products Division

Grants Officer:Christine Mueller

Performance Period: 9/15/2016-8/31/2020

Funding Level: \$338,451

Goals: The goal of this study is to implement and implant a networked neuroprosthesis in cervical spinal cord injury to provide grasp, reach, and trunk function.

Title: Whole-body Neuroprosthetic Approach for Incomplete Cervical Spinal Cord Injury (I01-RX-001804 – VA RRD)

Time Commitment: 3.0 calendar-months

Supporting Agency: VA-R Rehabilitation Research and Development Service

Office of Research and Development

Dept of Veterans Affairs

810 Vermont Ave., NW (10P9R)

Washington, D.C. 20420

Grants Officer: Brian Schulz, PhD,

Performance Period: 05/01/2015-04/30/2019

Funding: \$275,000/year

Goals: Evaluation of a fully implanted neuroprosthesis for incomplete spinal cord injury, including developing the screening methods and outcome measures to perform valid clinical studies in this population

Title: Training of Activity of Muscles Below the Injury Level in Complete SCI for Neuroprosthetic Control (477004)

Time Commitment: 3.6 calendar-months

Supporting Agency: Craig H. Neilsen Foundation

Grants Officer: Naomi Kleitman, Ph.D.

Performance Period: 07/31/17-07/30/2020

Funding: \$586,208 total

Goals: The first aim is to test a training sequence for improving the quality of below-injury signals that incorporates real-time visual biofeedback of generated EMG signals in a novel interactive visual interface which incorporates game-play. The second aim is to incorporate below-injury control sources into the control map for neuroprosthetic technology.

Title: Restoration of Grasp and Reach in Cervical Spinal Cord Injury (UH2-NS-103863)

Time Commitment: 0.60 calendar-months

Supporting Agency: NIH/NINDS, Bethesda, MD

Grants Officer: Nick Langhals, Ph.D.

Performance Period: 3/1/2018-2/28/2019

Funding: \$1,000,000/year

Goals: Initiate a multi-center clinical trial of the networked neuroprosthesis for hand function in cervical SCI

Title: Institute for Functional Restoration
Time Commitment: 4.2 calendar-months
Supporting Agency: Craig H. Neilsen Foundation
Grants Officer: Kim Cerise, Encino, CA
Performance Period: 7/31/2015 – 7/31/2020
Funding: \$250,000/year

Goals: Establish a non-profit organization that makes advanced technologies available to people with spinal cord injuries.

Completed

U01 NS-069517 Peckham (PI) 6/1/2010 – 5/31/2015

“Multi-functional Neuroprosthetic System for Restoration of Motor Function”

The purpose of this project is to implement a fully implanted system for individuals with SCI that is capable of providing four distinct functions: hand grasp, trunk stability, cough ability and bladder control.

Role: Co-Investigato

USAMRAA-SCIRP Peckham (PI) 9/30/2014 – 9/29/2017

“Efficacy Study of a Fully Implanted Neuroprosthesis for Functional Benefit to Individuals with Tetraplegia”

Clinical trial to evaluate the efficacy of a networked neuroprosthesis for hand function in spinal cord injury.

Role: Occupational Therapist

R01-NS-078789 Kilgore (PI) 9/30/11 – 8/31/15

“Below Injury Control of Upper Extremity Neuroprosthetic Systems”

The goal of this project is to evaluate the possibility of using muscles below the level of a spinal cord injury as control sources for an upper extremity neuroprosthetic system.

Role: Co-Investigator

“Debilitating Contractures in Spinal Cord Injury”; VAMR RR&D B7666R; 4/1/11-3/31/14

Role: Co-Investigator

“A Comparison of Two Surgical Procedures that Restore Elbow Extension”; VAMR RR&D B7515R; 10/01/10-09/30/14

Role: Site Principal Investigator

Craig F. Neilsen Foundation Marino (PI) 07/1/13-06/30-15

“Responsiveness of the Capabilities of Upper Extremity Test (CUE-T)”

Goals: The goal of this project is to evaluate the use of a new outcomes assessment for upper extremity function in spinal cord injury. This is a multi-center study.

Role: Occupational Therapist

R01- EB-001740 Peckham (PI) 5/1/12 – 4/30/16

“Development of Networked Implantable Neuroprostheses”

The goal of this project is to implement a fully implanted, modular system for hand function and reach in individuals with SCI.

Role: Occupational Therapist