Wake Forest University School of Medicine

Neuroscience Clinical Trial and Innovation Center

Promoting development of new collaborative interactions between trainees, discovery scientists, and clinical investigators ACROSS THE ENTERPRISE

Purpose/Mission

The mission of the Neuroscience Clinical Trials and Innovation Center (NCTIC) is to promote advancement of Neuroscience Research.

Our focus is to develop new collaborations among basic science and clinical investigators with the goal of providing a platform for design and development of pilot studies, multi-center trials, and models of care into real-world implementation thereby bridging the gaps between basic science and clinical interventions. Part of our focus is to develop a pipeline of clinical trials to submit to NIH via the StrokeNet, NeuroNext, or the Trial Innovation Networks.

The overarching goal of NCTIC is to serve as a clearinghouse to facilitate interactions between basic science, clinical and public health investigators to develop and expand new interdisciplinary and translational studies that will improve patient care and outcomes in neurological disorders.

Our membership embodies the enthusiasm, excellence, and productivity we have to blur departmental boundaries and expand our mission to advance neuroscience research and patient care.

Leadership

<u>Co-Directors</u>

Cheryl Bushnell, MD, MHS
Professor, Neurology

Carol Milligan, PhD
Professor, Neurobiology and Anatomy

<u>Executive Committee</u>

Dwayne Godwin, PhD
Professor, Neurobiology and Anatomy

Andrew Asimos, MD
Medical Director,
Carolinas Stroke Network,
Neurosciences Institute, Atrium Health

Mark Hirsch, PhD, FACRM
Sr. Scientist,
Physical Medicine and Rehabilitation,
Carolinas Rehabilitation, Atrium Health

Membership

All members of the Atrium Health/WFUSM Neuroscience Community are considered members of NCTIC. We estimate our current membership includes over 150 members from >16 departments across Winston-Salem and Charlotte Campuses.

Training Components

Mentoring and Consultation on Project Design. StrokeNet, and NeuroNEXT provide several mentoring and training opportunities have been established for residents, fellows, and junior faculty. Launched by Dr. Pam Duncan, the Wake Investigator Network Development (WIND) is one example of a peer-mentoring forum that meets monthly. Dr. Duncan has mentored multiple faculty prior to their grant submissions, including Heidi Munger-Clary, Halley Alexander, and Araya Puwanant. This program has expanded to include investigators from other departments (e.g., David Klorig, Ken Kishida). Dr. Pam Duncan has stepped down from leading this effort. Dr. Heidi Munger Clary is currently directing the program.

Neuroscience Graduate Program

While not directly related to NCTIC, many of our members are training faculty for the Neuroscience Program at Wake Forest, a vibrant, productive, and collaborative effort by faculty and trainees to investigate molecular and cellular structures, local neural circuits and brain areas, and behavior to enhance our understanding of the functional organization of the nervous system. We are committed to the idea that neuroscience, broadly conceived, provides a fundamental framework for understanding the biological basis of behavior and the causes of neurological and psychiatric disorders. There are 49 training faculty (PhD training) in the program. Currently there are 73 students enrolled (49 PhD; 4 MD/PhD, 21 MS). 47% of our PhD students have secured independent funding or were supported by a T32 award. As of July 2022, our students contributed to 42 publications with an additional 29 under review). Our Neuroscience Graduate students are the engine of our research community.

Center Outcomes

Obtaining substantial improvements in clinical trial enrollments

We have been selected as a site for 12 trials (one currently in startup) through StrokeNet with a total of 116 subjects consented and 76 randomized. We have successfully enrolled participants in the emergency department, inpatient and outpatient settings for hyperacute treatment, prevention and recovery trials. In fact, Wake Forest is the 5th highest enrolling site for a hyperacute trial that enrolls and randomizes patients within 1 hour of receiving thrombolysis (MOST).
For NeuroNEXT, Wake Forest has been selected for 3 trials which include 19 enrollments, and has been a lead enroller for all 3 trials. The NeuroNEXT U24 renewal was submitted on November 21, 2022.

Center Outcomes

Promoting new translational neuroscience research programs that will lead to increased extramural funding: Pilot Awards

17 pilot awards were granted over the past three years together with the following outcomes from these projects:

- Three clinical trials registered on clinicaltrials.gov
- Seven published manuscripts
- Two manuscripts under review
- 15 meeting abstracts

17 Pilot Awards		Total Investment **$265,000**
Extramural Applications Submitted		Applications Funded
Foundations:	3	3
NIH K23:	1	1
NIH R03.	1	1
NIH R21:	3	3
NIH RO1:	6	0
DoD:	1	1
VA.	1	1
		Awarded Extramural Funding (total costs) **$3,573,664**

<u>Other Funding that is related to NCTIC</u>

U24NS107197: Wake Forest NeuroNext Clinical Site (WAKENN)
PI: Duncan 07/15/18-06/30/23 TC: $1,549,990
The goals of this project as a NeuroNEXT clinical site is to offer promising therapies for neurologic disorders.

U24NS107235: Western North Carolina StrokeNet
PI: **Bushnell** 08/01/18-07/31/23 TC: $1,519,566
The goal of this project is for Wake Forest Baptist Health to act as a Regional Coordinating Center in North Carolina and to successfully implement StrokeNet trials.

PLACER-2020C3-21070: Telehealth-Enhanced Assessment and Management after Stroke-Blood Pressure (TEAMS-BP)
Multi- PI: **Bushnell**, Cheryl D (contact); Rosamond, Wayne
01/2022-12/2028
TC: $29,684,064
Goals: Randomized Controlled Trial: Achieving Blood Pressure Goals after Stroke through Comparative Effectiveness of Intensive Tailored Telehealth Management vs. Intensive Clinic Management.

Dana Foundation: Development of Wake Forest Center for Neuroscience and Society
PI: **Milligan** (contact), Mielke, Benca 10/1/2022-2/28/2023
TC: $150,000

T32 NS115704-01: Neuroscience Training at Wake Forest
Program Director: **Milligan** 07/01/2021-06/30/2026 TC: $1,329,719
Goals: To broad education in fundamental neuroscience together with a strong foundation in experimental design, statistical methodology, quantitative literacy as well as strong oral and written communication skills.

Research Project Spotlight

Collaborative Care-Epilepsy: to close the treatment and outcome gaps for impactful mental health comorbidities in epilepsy.

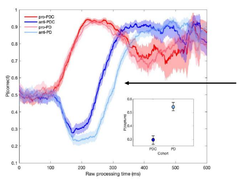
Heidi M. Munger Clary, MD, MPH[1], Allison Chandler, PhD[2]; Ashley Strahley, MPH[2]; Laura McDuffee, MPA[2]; Sabina B. Gesell, PhD[2]
Departments of [1]Neurology and [2]Social Sciences and Health Policy, Wake Forest University School of Medicine

- Care Manager (social worker or nurse): evaluation, bimonthly calls; team communication [patient, psychiatrist, neurology provider]
- Psychiatrist: care management team conferences with care manager →mental health treatment plan
- Neurology provider: prescribe antidepressants (based on mental health treatment plan recommendations), receive care manager updates about seizures

"[The care management team] sounds like the best solution that I've heard. I think that sounds really good. That would be great in helping me find somebody that would work with my doctor, and having them all in one area, I think it's a wonderful idea."

Development of a Non-Invasive Behavioral Biomarker of Neurodegenerative Disease State

High-resolution video-based eye tracking



By assessing performance on a novel eye tracking paradigm, we aim to develop a non-invasive behavioral biomarker with the sensitivity and specificity necessary to reliably diagnose early-stage Parkinson's Disease.

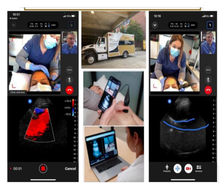
Early-stage Parkinson's Disease patients are significantly delayed in their ability to exert cognitive control over task performance.

- PI – Terrence Stanford[1]
- Co-I - Emilio Salinas[1]
- Co-I - Mustafa Siddiqui[2]
- Co-I - Mark Hirsch[3]
- Coordinator - Denise Anderson[1]
- Lab Technician - Evan Kattner[1]

1. Department of Neurobiology & Anatomy, WFSOM
2. Department of Neurology, WFSOM
3. Carolinas Rehabilitation, Atrium Health

Cranial Ultrasound Image Acquisition and Remote Physician Interpretation in a Moving Ambulance-Simulated Test to Assess Feasibility for pre-Hospital EMS Applications.

S Kapoor[2], C Glass[1, 2], B Jones[2], I Saunders[2], JT Winslow[1,2], D Nelson[1,2], M Anwar[3], SQ Wolfe[1,2], A Asimos[1,2], P Duncan[1,2], A Sarwal[1,2]
[1]Wake Forest School of Medicine,[2]Atrium Health Wake Forest Baptist Medical Center, [3]North Carolina A&T State University



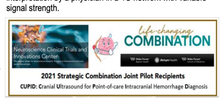
OBJECTIVE-We investigated the feasibility of cranial ultrasound image acquisition in a moving ambulance using a handheld device and tested the timeless of TeleGuidance™ & remote image interpretation by a physician in 4G network with variable signal strength.

RESULTS:

- Cranial ultrasound images through one temporal window were acquired in less than 2 minutes in a moving ambulance with acceptable quality/ resolution showing the midbrain and opposite skull, the two standard landmarks for cranial POCUS.
- After TeleGuidance™ with the remote physician, a formal visible report took additional 5 minutes with 3 bars of signal strength.
- When the ambulance drove through a 4 bar (highest) signal strength, the time from image acquisition to report was reduced to 2 minutes

CONCLUSION:

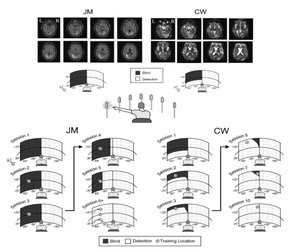
- Cranial ultrasound image acquisition using handheld ultrasound is feasible in a moving ambulance providing reasonable quality images of visualized landmarks with a very quick turnaround time required for TeleGuidance™ & remote image interpretation by a physician in a 4G network with variable signal strength.



Acknowledgments: Iredell, Cabarrus & Cherokee Regional EMS agencies. Iredell Regional Medical Center & Mission Regional Medical Center

Multisensory Rehabilitation of Hemianopia

Benjamin A. Rowland [1], Cheryl Bushnell [2], Pamela Duncan [2], Barry E. Stein [1]
[1] Neurobiology and Anatomy, [2] Neurology, Wake Forest University School of Medicine



Hemianopia (unilateral blindness) is a common consequence of visual cortex damage thought to be permanent. We developed a novel noninvasive multisensory rehabilitation paradigm based on our studies of sensory plasticity.

We tested it in two human patients partially blinded by stroke.

Over several 2-hour weekly training/testing sessions both patients progressively regained the ability to perceive light flashes throughout their previously blind regions. They also regained some ability to detect and describe moving and stationary objects, and both reported significant improvements in their quality of life.

Study Published in: Rowland BA, Bushnell CD, Duncan PW, Stein BE (2023) Ameliorating Hemianopia with Multisensory Training. *Journal of Neuroscience*:JN-RM-0962-22 (online ahead of print)

Wake Forest University School of Medicine is the academic core of Advocate Health.