Industry sponsored projects may require that students sign a nondisclosure agreement and/or a pre-invention assignment agreement. These forms can be found at http://www.me.umn.edu/courses/me4054/agreements/

<table>
<thead>
<tr>
<th>TITLE</th>
<th>Arm Rehab Device</th>
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<tbody>
<tr>
<td>SPONSOR</td>
<td>Sister Kenny Research Center, Sister Kenny Rehabilitation Institute</td>
</tr>
<tr>
<td>Advisor 1</td>
<td>Matthew White, Instructor Scientist, Occupational Therapist Sister Kenny Research Center, Sister Kenny Rehabilitation Institute Mail Route 12210 800 East 28th Street Minneapolis, MN 55407 612-863-7642 612-863-6299 <a href="mailto:Matthew.White@Allina.com">Matthew.White@Allina.com</a> <a href="mailto:dnilsson@rxfunction.com">dnilsson@rxfunction.com</a></td>
</tr>
<tr>
<td>Advisor 2</td>
<td>Daniel Nilsson, Product Design Engineer, SKRC/RXFunction Sister Kenny Research Center, Sister Kenny Rehabilitation Institute Mail Route 12212 800 East 28th Street Minneapolis, MN 55407 612-702-2919</td>
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</tbody>
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Project Background:
At the Sister Kenny Research Center we have a focus on development of technology that can help improve rehabilitation in general and patients’ quality of life in particular. In the last few years there has been research suggesting that early and intensive intervention can have a positive impact on patients with stroke. Patients with a stroke typically result in hemi paresis or weakness of the arm. Currently, patients in the hospital rehabilitation unit receive approximately 3 hours/day of therapy. Although some of this time is dedicated to rehabilitation of the arm, we want to explore the possibility of creating more opportunity for patient to engage in exercise of the arm. This will be done by advancing the current prototype/design (From FALL 2012, ME 4054) that aimed to be used independently by the patient seated in a wheelchair.

Project Objectives:
The Design Team involved in this project will design and build a prototype of this Arm Rehab Device with close interaction with clinicians, and researchers at the Sister Kenny Research Center. This prototype should be:

- Performed only by the affected (weaker) arm (non-affected arm is not used). The device would enable patient to reach (shoulder flexion and elbow extension) slightly by providing the necessary assistance.
- Ideally the desired range of motion (“how far to reach”) could be selected by the user
- Small footprint, allowing to be positioned on arm rest of wheelchair, or an over the bed (hospital) table.
- Minimal set-up involvement, preferable allowing patient to perform one-handed
- The Team will have access to resources at the Sister Kenny Research Center for testing in the design specifications phase of the project.
Advisors:

Matthew White
Licensed occupational therapist and the clinical technology lead at Sister Kenny Rehabilitation Institute. Matthew is also an instructor scientist within the Sister Kenny Research Center. Matthew has experience with project management of various activities and advanced modalities including Virtual Reality, EMG Biofeedback, Robotics, and Telerehabilitation. From these projects, Matthew has gained valuable experience from working with engineers, software designers, and other rehab professionals on a national level to push the envelope in the field of rehabilitation. Matthew has participated in problem solving with outside technology vendors and our internal Information Services (I.S.) to bring new technologies to the Institute.

Daniel Nilsson
With an educational background from KTH, Stockholm, Sweden and the Master’s degree program in Industrial Engineering and Management with a focus on Mechatronics, Daniel brings experience from multiple early stage technology development projects of medical as well as consumer electronics products. Writing his Master’s thesis on the subject of globally distributed design teams engaging with a team of engineering students at KTH and the University of Minnesota Daniel has since supervised a number of Master’s Thesis projects in the Product Design and Mechatronics engineering fields as well as senior design projects for mechanical engineering students. Previously Principal Investigator on the project “A Wearable ‘Balance Booster’ to Enhance Mobility through Vibrotactile Feedback” awarded a phase I SBIR grant from NIH, Daniel is currently applying his time navigating this device towards market approval from the FDA.

Company: Sister Kenny Research Center
Innovative research has been part of the mission at Sister Kenny Rehabilitation Institute for many years. With the opening of the Sister Kenny Research Center at Abbott Northwestern Hospital in 2007, all the Institute's research activities are now located under one ‘umbrella. By coordinating all investigative studies within the new Research Center, the Institute is more strategic and focused when conducting research and development projects.