



Capabilities

Communicating the Science of Prosthetics and Orthotics

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Gala Heralds Merger Between NUPRL and NUPOC

R. J. Garrick, PhD

The NUPOC gala held on February 26 publicly announced the merger between the **Northwestern University Prosthetics Orthotics Center (NUPOC)** and the **Northwestern University Prosthetics Research Laboratory (NUPRL)**. The educational program and the research program will become a single entity. The gala raised funds through silent auction to support renovations to NUPOC's new educational and research center, conveniently located on the Northwestern University campus near the Feinberg School of Medicine, Galter Health Sciences Library, anatomy laboratory, and other academic labs and resources. The merger and move are scheduled for completion by August 2010.



VA Assistant Secretary Major **Tammy Duckworth** attended the NUPOC gala and spoke at the podium.

The gala also provided a forum to recognize three individuals who have excelled through service to the nation, sports, or music and also have enhanced public understanding about amputation and physical disability. Honored by induction into the NUPOC Hall of Fame were: VA Assistant Secretary Major **Tammy Duckworth**; Mr. **Ron Santo** of Chicago Cubs baseball fame; and violin virtuoso **Rachel Barton Pine**. Major Duckworth spoke at the podium, expressing heartfelt appreciation for the work of prosthetists and orthotists as well as sincere encouragement to others who experience an amputation. Mr. Ron Santo addressed the audience via a pre-recorded video, and Ms. Rachel Barton Pine, who had been detained by weather in New York, was represented

by a member of the **Rachel Elizabeth Barton Foundation (REBF)** and a recent REBF award winner played violin.

Elliot Roth, MD (Professor and Chairman, Department of Physical Medicine and Rehabilitation, Northwestern University), served as Master of Ceremonies. Mr. **Thomas Karolewski**, CPO (Director of Prosthetics Education, NUPOC), addressed the audience of 200 to acknowledge the significant personal and professional contributions of the patient models whose participation and contribution are so vital to student education and clinical training at NUPOC.

The formal program concluded with **Robert Jaeger**, PhD, who presented to **Dudley S. Childress**, PhD (*in absentia*) a lifetime service award from the **Veterans Affairs Department of Rehabilitation Research and Development**. (See Page 3.) The rest of the evening was devoted to convivial interactions among the faculty, staff, students and patient models.

We celebrate the NUPRL-NUPOC merger and welcome its relocation as a unified research and education center!

Gala Heralds NUPRL-NUPOC Merger



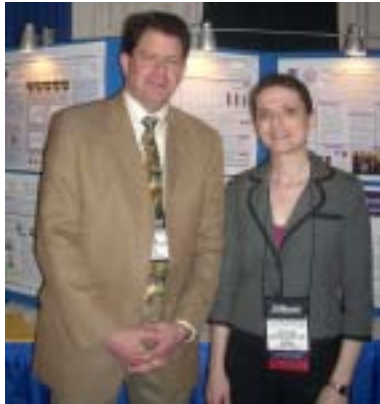
VA Assistant Secretary Major **Tammy Duckworth** (left) shares a moment with NUPRL graduate **Brian Ruhe**, PhD (right), at the NUPOC Gala held February 26, 2010.

NURERC Shines at Academy Meeting

R. J. Garrick, PhD

The **Northwestern University Rehabilitation Engineering Research Program (NURERC)** and the **Northwestern University Prosthetics-Orthotics Center (NUPOC)** were well represented at the **36th American Academy of Orthotists and Prosthetists Annual Meeting and Scientific Symposium (AAOP)** held from February 24 to 27 in Chicago, IL.

The AAOP educational program included professional development, clinical techniques, instructional courses, symposia, and free papers. NURERC and NUPOC personnel reported on research findings relevant to the fields of P&O (See list of presentations at end of article). During the Academy meeting, the **Northwestern University Prosthetics Research Laboratory (NUPRL)** and NUPOC sponsored a booth in



Steven A. Gard, PhD, and Stefania Fatone, PhD, BPO(Hons), took time between their busy speaking engagements to help man the NUPRL/NUPOC information booth at the 2010 Academy meeting.

the Exhibit Hall that featured posters about current research projects. Laboratory personnel supplemented the information for attendees.

During this meeting, **Stefania Fatone, PhD, BPO(Hons)** whose paper, written with **Rebecca Stine, MS**, and **Steven A. Gard, PhD**, received a **Thranhardt Lecture Award**. Also, Dr. Fatone's contributions to research in P&O were recognized with the prestigious **AAOP Research Award**. The Academy also honored **John Michael, CPO, MEd**, for his lifetime service to the discipline of P&O. In conjunction with the Academy meeting, the **Veterans Affairs Office of**

Rehabilitation Research and Development recognized the distinguished career of **Dudley S. Childress, PhD**, with an award for his lifetime service. (See Page 3.)

NURERC Presentations at 2010 AAOP Meeting:

Boutwell, E. and Gard, S. "Study of Residual Limb/Prosthetic Socket Compliance in Transtibial Amputees."

Fatone S. Participant, "Knowledge Translation: How to Get Research Results to People Who Need to See Them." Special Event Program.

Fatone S., Stine R. and Gard S. "Randomized Cross-over Study of AFO Ankle Components in Adults with Post-stroke Hemiplegia." (Recipient, Howard R. Thranhardt Lecture Award.)

Gard, S. Participant, "Perspectives on O & P Research – Finding Common Ground." Special Event Program.

Hansen, A., Klodd, E., Meier, M., Fatone, S., Edwards, M., Sessoms, P., Childress, D. "Use of Experimental Prosthetic Feet to Study the Effects of Prosthetic Foot Features on Gait of Prosthesis Users."

Heckathorne, C. Participant, "Report on the State of the Science Conference on Upper Limb Prosthetic Outcome Measures." Special Event Program.

Michael, J. Moderator, "Prosthetic Grand Rounds: Evidence Based Decisions about Lower Limb Prostheses."

Robinson, C., Fatone, S., and Gard, S. "Role of Journal Club for Professional Development: Facilitating Knowledge Translation."

NUPOC Welcomes Jared Howell, CPO

R. J. Garrick, PhD

Jared Howell, CPO, has joined NUPOC as Assistant Director, Prosthetics Education. A NUPOC certificate holder in Prosthetics (2005) and Orthotics (2006), Mr. Howell also has a BS in Manufacturing Engineering Technology (Brigham Young University, 2005). Prior to his appointment at Northwestern University, Mr. Howell was Clinical Practice Manager at Ability Prosthetics and Orthotics (Exton, PA).



Jared Howell, CPO

Education Program. In addition to teaching, he participates in NUPOC's journal club and the NURERC Advisory Panel. He speaks Spanish and is interested in international prosthetics education and service programs. He plans to develop translational research projects in the areas of prosthetics, orthotics, and medicine. He is a member of the American Academy of Orthotists and Prosthetists (AAOP).

At NUPOC Mr. Howell instructs students who are enrolled in NUPOC's Clinical

live in Naperville.

Kudos to Stefania Fatone, Dudley Childress, and John Michael

R. J. Garrick, PhD

Stefania Fatone Receives AAOP Research Award



Stefania Fatone, PhD, BPO(Hons), received the 2010 AAOP Research Award. Also, for the second time, Dr. Fatone received a Thranhardt Award.

Stefania Fatone, PhD, was awarded the Research Award by the American Academy of Orthotists and Prosthetists (AAOP) at the 36th Annual Meeting and Scientific Symposium on February 24 to 27, Chicago, IL. This award recognizes AAOP members who perform the most outstanding research in the field of orthotics and prosthetics. Annually, Dr. Fatone has published or presented her research as part of an Academy

sponsored scientific education program within the previous three years. This year for the second time, Dr. Fatone received a **Howard R. Thranhardt Lecture Award**.

Dudley Childress Receives VA Lifetime Service Award

Dudley S. Childress, PhD (Director Emeritus, Prosthetics Research Laboratory and Rehabilitation Engineering Research Program; Professor Emeritus, Department of Physical Medicine and Rehabilitation, and Biomedical Engineering Department) was honored with an **Award in Recognition of Lifetime Service to the Veterans Affairs Office of Rehabilitation Research and Development**. This award was presented in conjunction with the 36th annual Meeting of the American Academy of Orthotists and Prosthetists at the Gala Celebration for the Northwestern University Prosthetics-Orthotics Center. (See Page 1.)

The award, accompanied by a letter from **Joel Kupersmith, MD** (Chief Research and Development Officer, Veterans Health Administration), notes Dr. Childress' distinguished research and his contribution to advancements in the fields of prosthetics, orthotics, and rehabilitation engineering. Dr. Kupersmith valued Dr. Childress' guidance in ensuring that the VA "funds the most scientifically meritorious research studies" and charts "a steady course of progress and practicality."

The VA Research and Development Award was presented by **Robert Jaeger, PhD** (Scientific Program Manager, VA Rehabilitation Engineering and Prosthetics/

Orthotics Program, Washington, D.C.). Robert Jaeger serves as the Scientific Program Manager for the Rehabilitation Engineering and Prosthetics/Orthotics Program. Prior to joining the VA, Dr. Jaeger held posts in the National Science Foundation's Engineering Directorate; the National Institute on Disability and Rehabilitation Research (NIDRR); and was professor of medical engineering at the Illinois Institute of Technology, with an adjunct appointment at the Northwestern University Feinberg School of Medicine and the Rehabilitation Institute of Chicago.



Dudley S. Childress, PhD, received an Award in Recognition of Lifetime Service to the Veterans Affairs Office of Research and Development.

Dr. Childress was unable to attend the event and **Steven A. Gard, PhD** (Director, Prosthetics Research Laboratory and Rehabilitation Engineering Research Program) accepted the award and expressed appreciation on Dr. Childress' behalf. Subsequently, Dr. Gard presented the VA award to Dr. Childress.

John Michael Receives Titus Ferguson Award

John Michael, CPO, MEd, received the **Titus Ferguson Award** presented by the American Academy of Orthotists and Prosthetists at the 36th Annual Meeting and Scientific Symposium on February 24 to 27, Chicago, IL. This lifetime achievement award represents the

Academy's highest level of recognition that is bestowed upon an outstanding academician whose accomplishments and contributions have made a significant impact on the growth and development of the P&O profession. Mr. Michael is highly dedicated and has demonstrated sustained devotion and leadership that contributes to the advancement of the Academy and the P&O profession.



John Michael, CPO, MEd, received the 2010 AAOP Titus Ferguson Award in recognition of his lifetime achievements in P&O.

Rekindling Collaborative Spine Research

Stefania Fatone, PhD, BPO(Hons) and R. J. Garrick, PhD

Since 2003, NURERC has collaborated with the **Department of Neurological Surgery** at Northwestern University to assess the role of the spine in walking and the effects of spinal pathology and surgical intervention on function. Initially, neurosurgeon **Steven Ondra**, MD (currently, Senior Policy Advisor for Health Affairs, Veterans Administration, Washington, D.C.) was instrumental in securing funding from **Medtronic-Sofamor-Danek** and worked closely with the project. Currently, **Aruna Ganju**, MD (Department of Neurological Surgery) is the principal investigator for NURERC's ongoing Medtronic-funded collaboration.

This collaborative research has been supported by joint funding from Medtronic-Sofamor-Danek and the **National Institute on Disability and Rehabilitation Research** (NIDRR) that supports the NURERC. To date, this project has generated prolific results, including data for two theses, four publications, and numerous presentations. (See references cited in the panel below.) These projects were formerly managed by **Stefania Fatone**, PhD, BPO(Hons), and have involved NUPRL graduates **Regina Konz**, PhD (Zimmer Orthopedic, MN), and **Devjani Saha**, MS.

Now, **Pranitha Gottipati**, PhD, who works from the NURERC laboratory as a post-doctoral fellow in the Department of Neurological Surgery, has assumed the day-to-day responsibilities for managing these collaborative projects and interfacing between NURERC and the Department of Neurological Surgery. (See Page 5.)

Current projects consist of investigations of the role of the spine in walking, headed by Dr. Ganju; and a new study directed by **Tyler Koski**, MD, that explores sagittal spinal alignment. **Rebecca Stine**, MS, (Manager of the VA Chicago Motion Analysis Research Laboratory (VACMARL)), Ms. **Sara Thompson** and Ms. **Narina Simonian** (Research Coordinators at the Department of Neurological Surgery) provide additional and invaluable support for these projects.

The initial project has inspired a related project funded by **Veterans Affairs** to explore the effects of spinal surgery on the energy expenditure of walking. The latter project is headed by principal investigator **Steven A. Gard**, PhD, and co-investigators Aruna Ganju, MD, and Stefania Fatone, PhD, BPO(Hons).

Spine Research: Publications and Presentations

1. Konz, R., R. Stine, S. Fatone, A. Ganju, A. Jorge, S. Gard, D. Childress, and S. Ondra. *Development of an Advanced Biomechanical Spine Model to Assess the Effect of Surgical Stabilization and Alignment on Gait*. In *10th International Meeting on Advanced Spine Techniques*. 2003. Rome, Italy.
2. Konz, R., R. Stine, S. Fatone, S. Gard, D. Childress, A. Ganju, and S. Ondra. *An Advanced Biomechanical Model to Assess How Spinal Motion Contributes to Gait: Preliminary Data*. In *8th Annual Meeting of the Gait and Clinical Movement Analysis Society*. 2003. Wilmington, DE, USA.
3. Konz, R., R. Stine, A. Ganju, S. Fatone, A. Jorge, S. Gard, D. Childress, and S. Ondra. *Development of an Advanced Biomechanical Spine Model to Assess the Effect of Surgical Stabilization and Alignment on Gait*. In *53rd Annual Meeting of the Congress of Neurological Surgeons*. 2003. Denver, CO.
4. Konz, R., S. Fatone, and S. Gard. *The Effect of Thoraco-lumbosacral Orthoses on Gait*. In *11th World Congress of the International Society for Prosthetics and Orthotics*. 2004. Hong Kong.
5. Konz, R., S. Fatone, and S. Gard. *The Effect of Thoraco-lumbosacral Orthoses on Gait*. In *9th Annual Meeting of the Gait and Clinical Movement Analysis Society*. 2004. Lexington, KY, USA.
6. Konz, R., A. Ganju, S. Fatone, S. Gard, and S. Ondra. *Non-invasive Measurement of Static and Dynamic Alignment: Preliminary Data*. In *39th Annual Meeting of the Scoliosis Research Society*. 2004. Buenos Aires, Argentina.
7. Konz, R., A. Ganju, S. Fatone, S. Gard, and S. Ondra. *Non-invasive Measurement of Static and Dynamic Alignment: Preliminary Data*. In *11th International Meeting on Advanced Spine Techniques*. 2004. Southampton, Bermuda.
8. Konz, R., S. Fatone, and S. Gard. *The Effect of Thoraco-lumbosacral Orthoses on Gait*. In *Annual Meeting of the American Academy of Orthotists and Prosthetists*. 2005. Orlando, Florida.
9. Konz, R., S. Fatone, S. Gard, A. Ganju, and S. Ondra. *The Effects of Spinal Restriction on Walking: II. Lower Limb Data*. In *Scoliosis Research Society 40th Annual Meeting*. 2005. Miami, Florida.
10. Konz, R., S. Fatone, S. Gard, A. Ganju, and S. Ondra. *The Effects of Spinal Restriction on Walking: II. Lower Limb Data*. In *12th International Meeting on Advanced Spine Techniques*. 2005. Banff, Canada.
11. Konz, R., A. Ganju, S. Fatone, S. Ondra, and S. Gard. *Non-invasive Measurement of Static and Dynamic Alignment*. In *Congress of Neurological Surgeons*. 2005. Boston, Massachusetts.
12. Konz, R., A. Ganju, S. Fatone, S. Ondra, and S. Gard. *The Effects of Spinal Restriction on Walking: I. Regional Spinal Kinematics*. In *12th International Meeting on Advanced Spine Techniques*. 2005. Banff, Canada.
13. Konz, R., S. Fatone, and S. Gard. *The Effect of Restricted Spinal Motion on Gait in Able-bodied Persons*. *Journal of Rehabilitation Research and Development*, 2006. 43(2): p.161-170.
14. Konz, R.J., S. Fatone, R.L. Stine, A. Ganju, S.A. Gard, and S.L. Ondra. *A Kinematic Model to Assess Spinal Motion during Walking*. *Spine*, 2006. 31(24): p.E898-906.
15. Saha, D., *The Effect of Trunk Flexion on Standing and Walking*, *Biomedical Engineering*, Northwestern University, Evanston IL, 2006.
16. Saha, D., S. Gard, and S. Fatone. *Vertical Ground Reaction Force During Trunk-flexed Gait*. In *American Society of Biomechanics*. 2006. Blacksburg VA.
17. Saha, D., S. Gard, S. Fatone, and S. Ondra. *The Effect of Trunk Posture on Global Balance*. In *56th Annual Congress of Neurological Surgeons*. 2006. Chicago IL.
18. Konz, R., *The Role of the Spine in Human Walking: Studies of Able-bodied Persons and Individuals with Spine Pathologies*, PhD, Biomedical Engineering, Northwestern University, Evanston, Illinois, 2007.
19. Saha, D., S. Gard, S. Fatone, and S. Ondra. *The Effect of Trunk-Flexed Postures on Balance and Metabolic Energy Expenditure During Standing*. *Spine*, 2007. 32: p. 1605-1611.
20. Saha, D., S. Gard, and S. Fatone. *The Effect of Trunk Flexion on Able-bodied Gait*. *Gait and Posture*, 2008. 27(4): p. 652-660.

Pranitha Gottipati, PhD, Coordinates NURERC Spine Research

R. J. Garrick, PhD.

Pranitha Gottipati, PhD, holds a doctorate in Engineering Mechanics (Virginia Tech, Blacksburg, VA, 2009) and a master's degree in Mechanical Engineering (Ohio University, Athens OH, 2004). She was a 2005 Pratt Fellowship recipient. Currently, she is a Postdoctoral Fellow in the Department of Neurosurgery and works from an office at NUPRL. Dr. Gottipati liaises between NURERC and the Department of Neurosurgery on collaborative research projects, "Analysis of Pathological Spinal Motion" and "Sagittal Spinal Alignment." (See Page 4.)



Pranitha Gottipati, PhD

Her experience includes experimental and modeling research in musculoskeletal biomechanics and nonlinear rigid body dynamics, including Lagrangian mechanics. She has conducted vibrational analyses of discrete and continuous systems, and finite element methods in machine design. Applying her interest in mathematical modeling to the human spine, Dr. Gottipati

developed a mathematical model of the trunk to estimate dynamic muscle forces and spinal loads during flexion and extension movements of the torso. Other prior research on the human spine includes quantification of dynamic stability of the lower spine using Lyapunov Exponents and assessment of the effect of low back fatigue on spinal stability. [This study was supported by grants R01 AR46111 from NIAMS of the National Institute of Health and R01 OH07352 from NIOSH of the Centers for Disease Control.] She has instructed engineering, is actively involved in journal clubs, and participated in an association that promotes managerial skills among undergraduate students.

In her spare time, she reads eclectically, both fiction and non-fiction authors. She also enjoys cooking Indian and international cuisines. Dr. Gottipati and her husband live in Chicago.

NURERC Advisory Panel Convenes

R. J. Garrick, PhD

The first meeting of the NURERC Advisory Panel convened March 25, when Panelists met in person or virtually via teleconference or videoconference with NURERC personnel. **Steven A. Gard, PhD**, and **Stefania Fatone, PhD, BPO(Hons)**, oriented Panelists to the history and mission of the Northwestern University Rehabilitation Engineering Research Center (NURERC), and provided an overview of current projects. NURERC project leaders attend Advisory Panel meetings to discuss their research with the external advisors. Panelists' suggestions will supplement ongoing research directions. Also, Panelists



Craig Heckathorne, MSc, Andrew Hansen, PhD, and Christopher Robinson, CPO, MBA, ATC, attend the first NURERC Advisory Panel Meeting.

will help develop topics and themes for the upcoming State of the Science meeting. To facilitate communications and the

exchange of ideas among Panel members, Panelists use a dedicated file sharing website at PBWorks.

The NURERC Advisory Panel consists of technical and consumer advisors. Members include: **John Angelico, CPO, Linda Ehrlich-Jones, PhD, RN, Stefania Fatone, PhD, BPO(Hons), Steven A. Gard, PhD, R. J. Garrick, PhD, Michelle Hall, CPO, Andrew Hansen, PhD, Gerry Harris, PhD, Craig Heckathorne, MSc, Allen Heinemann, PhD, Tammie Higginbotham, Jared Howell, CPO, Terry Karpowicz, Dulcey Lima, CO, Donald McGovern, CO, John Michael, CPO, Christopher Robinson, CPO, MBA, Joshua Rolock, PhD, David Rotter, CP, Rebecca Stine, MS, Kerice Tucker, Jack Uellendahl, CP, and Kathy Waldera, MS.**



Steven A. Gard, PhD, orienting the Advisory Panelists to NURERC goals and activities.

Ms. Yasmin Othman Visits from University of Jordan

R. J. Garrick, PhD

NURERC welcomed Ms. **Yasmin Othman**, Orthotist and Senior Lecturer (Rehabilitation Sciences Faculty, the University of Jordan) on February 9 and 10. **Stefania Fatone**, PhD, BPO(Hons), facilitated her visit. Ms. Othman toured the laboratory where she learned about current and past NURERC research projects. Ms. Othman conducted observations at Clinical Services in the Rehabilitation Institute of Chicago (RIC). Also, she toured the Northwestern University Prosthetics Orthotics Center, where she observed several orthotics classes and discussed orthotics education with **Christopher Robinson**, CPO, MBA.



Stefania Fatone, PhD (left), and Ms. Yasmin Othman, Orthotist (right).

Ms. Othman's research foci include orthotics, biomechanics, gait analysis, and pediatrics. She specializes in lower limb orthotics, especially for pediatric populations. Ms. Othman trained and received her certification in Orthotics and Prosthetics through an intensive rehabilitation program at the University of Jordan. Annually since 2003, the University of Jordan accepts 20 students who graduate with a bachelor degree in Orthotics and Prosthetics. These qualified orthotists and prosthetists

are prepared through close training with the Departments of Physical Therapy and Occupational Therapy to work with rehabilitation teams that improve patients' functional benefits and outcomes in Jordan and nearby countries.

Subsequently, Ms. Othman completed intensive advanced courses in lower limb orthotics and mobility aids at the **National Centre for Training and Education in Prosthetics and Orthotics**, University of Strathclyde (Scotland). In conjunction with the bioengineering unit at the University of Strathclyde, Ms. Othman is completing a research project that focuses on a Post Polio Syndrome (PPS) population.

Although Jordan has been polio-free since 1995, a large population of aging, underserved, individuals experience PPS. Ms. Othman is determined to develop funding, outreach programs, and orthotic services for those Jordanians with PPS. Dr. Fatone and Ms. Othman discussed orthotics research, particularly with respect to potential collaboration on projects that would develop and provide orthoses for the PPS population.

Technical Orthopedics Group Visits NURERC

R. J. Garrick, PhD

On March 1, orthopedic surgeons **Maximilien Jung**, MD (Switzerland), **Jürgen Götz**, MD (Germany), **Nadja Walochnik**, MD (Austria), and Mr. **Ingo Pfefferkorn**, CPO and engineer (Germany), visited NURERC where they learned about current research and development projects. As part of the information exchange, the Fellows presented talks about their work in Technical Orthopedics, a comprehensive musculoskeletal discipline that includes orthopedic surgery, physical medicine and rehabilitation, physical therapy, as well as prosthetics and orthotics. Dr. Jung presented *Mirror Therapy in Post-amputation Pain*; Dr. Götz presented *Importance of Gait Analysis for Quality Assurance in Orthopedics*; Dr. Walochnik presented *Rehabilitation of*



(From left): Ingo Pfefferkorn, CPO, Steven A. Gard, PhD (Director, NURERC), Maximilien Jung, MD, Nadja Walochnik, MD, and Jürgen Götz, MD.

a Bilateral Amputee with 2 C-legs; and Mr. Pfefferkorn, CPO, presented *Overview of Ischial Containment Socket Design and the Very Short Femoral Stump*.

This is the seventh group sponsored by **Initiative '93** that has visited NURERC on the travel portion of their 2-year fellowship. The travel portion allows a cohort of Fellows to spend about 6 weeks in Canada and the USA where they visit hospitals and research facilities exchanging information about Technical Orthopedics. Initiative '93 was founded by Dr. **Georg Neff** (Berlin), Dr. **René Baumgartner** (Münster), and others during the International Society of Prosthetics and Orthotics (ISPO) World Congress 1992 that was held in Chicago.

Eric Nickel Ignites Interest in Science and Engineering

R. J. Garrick, PhD, with Eric Nickel, BS

Eric Nickel, BS (See *Capabilities* 15(4)8, 2007 and 17(4)4, 2009) is conducting research at NUPRL where he has developed a prosthetic foot-ankle system that adapts passively to surfaces [“Further Development of an Adaptable Prosthetic Ankle” funded by National Institute on Disability & Rehabilitation Research (NIDRR) of the Department of Education under grant number H133E080009]. This summer he will complete his master’s degree in biomedical engineering. Mr. Nickel also makes time to volunteer as a Science Mentor at the Science Club of the **McCormick Boys and Girls Club (MBGC)**.

As a Science Mentor, Mr. Nickel tutors his students on an individualized basis to expand their interest, knowledge, and abilities in science. “*The kids I work with are curious and they want the chance to explore the world. Some students may lack support at home*



Science Mentor **Eric Nickel, BS**, explains prosthetic components and functions to students at MBGC.

or other educational resources, so I believe it is important for scientists and engineers in training to commit even a few hours each week to programs like the McCormick Boys and Girls Club, where Science Mentors interact with the students as positive role models.”

Mr. Nickel recognizes the value of cumulative exposure rather than a single experience to help new interests burgeon. Reflecting on his career choice in science and engineering, he explained, “*I always loved learning how things work. I spent my time with books about the life cycle of stars and what causes thunderstorms. Also, for years I learned from working with my father on many projects. When I was in 8th grade, my father suggested that engineering might be a good fit for my interests and abilities. In high school I took related*

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McCormick Boys and Girls Club Visits NURERC

R. J. Garrick, PhD

On March 1, the Science Club of the **McCormick Boys and Girls Club (MBGC)** toured NURERC where they learned about Upper Limb Prosthetics from **Craig Heckathorne, MSc**; Motion Analysis from **Rebecca Stine, MS**, and **BJ Johnson, MS**; and the Shape&Roll Prosthetic Foot from **Kerice Tucker, Research Engineer**. NURERC graduate student **Eric Nickel** has offered his knowledge as a Science Mentor to 7th and 8th grade students who participate in the Science Club throughout this academic year.

Led by Northwestern University’s **Michael Kennedy, PhD** (Director, Office for Science Outreach and Public Engagement, Office for Research) and **Carolyn Jahn, PhD** (Associate Professor, Department of Cell and Molecular Biology), this extracurricular program meets after school and seeks to engage youth in learning about



Students, teachers and mentors of the McCormick Boys and Girls Club toured NURERC and learned about prosthetics and rehabilitation engineering. (Photograph used with permission of MBGC.)

biomedical science. Each of the three 10-week curricula concludes with student presentations to their family and friends. Northwestern University science students serve as role models and mentors who share their passion for science and enhance science education in the local schools and community.

The winter 2010 session features **Get-a-Grip!**, where Science Club members consider upper limb prostheses from the perspectives of design for function, cosmesis, and fabrication. The Get-a-Grip! curriculum was developed

by **Suzanne Olds, PhD** (Assistant Chairperson, Biomedical Engineering), and others. It is available to middle-school students through their science classes. The Science Club visited NURERC in preparation for designing and building functional upper limb prostheses. This is the first presentation of Get-a-Grip! in the McCormick Boys and Girls Club.

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Eric Nickel Ignites Interest in Science and Engineering

classes to decide whether engineering would be a career path for me. My drafting teacher was inspirational; he was the one who sealed the deal for me. I attribute the majority of my skill with mechanical design to his motivational teaching."

Exposure to new concepts and experiences through personal interaction are formative experiences and Mr. Nickel introduced his MBGC students to a wide range of engineering specialties. Using his interpersonal and engineering skills, Mr. Nickel helped his students learn how to brainstorm, solve design problems, and identify stages in design innovation. By breaking large problems into manageable units, he helped

his students define, research, sketch, design, build, and test mock-ups, ultimately creating a prosthetic upper limb.

Mentor-student interactions, paired with the goal-oriented Get-a-Grip! curriculum, encourage young students at MBGC toward greater fluency in math, science, and engineering. Mr. Nickel noted, "*Programs like MBGC may enable and motivate more children to pursue science classes in high school, where I hope they will encounter excellent teachers who will inspire them to go to college and become scientists or engineers. I hope that my efforts will help them discover that they have a world of potential before them, whether they decide to become artists, athletes, scientists, or parents. Life itself is a fascinating journey if we open ourselves to the wonder that surrounds us.*" Mr. Nickel hopes that his mentorship may have encouraged some MBGC students to take the initial steps toward a career in science.

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