



Dr. Woo's 60th Birthday Celebration

by Pat McMahon



Dr. Woo and Lynette Fleck at the banquet dinner.

This past year ORLAC helped honor **Dr. Savio L-Y. Woo's** 60th birthday with a symposium that was held on July 14, 2001 entitled "Bioengineering At The Dawn Of The 21st Century" in Pittsburgh, PA. With international attendance, the symposium was an intimate gathering of friends and Dr. Woo's former students. The research presentations were of outstanding caliber on topics ranging from robotics, joint biomechanics and tissue engineering to computational research and entrepreneurial endeavors. The day began with a session chaired by **Dr. Y.C. Fung**, Dr. Woo's mentor from the University of California at San Diego and **Dr. Michael Lai** from Columbia University. After introductory remarks by Dr. Fung: **Drs. Freddie Fu, Jennifer Wayne, Cyril Frank, and Jeffrey Weiss** delivered lectures on soft tissue function. **Drs. Christopher Harner and Lars Gilbertson** of Pittsburgh chaired the second session of the day, which focused on the anterior cruciate ligament. Speakers in this session traveled from far and wide, **Dr. Masataka Sakane** came from Japan, **Dr. Christos Papageorgiou** from Greece, **Dr. Yukihsa Fukuda** from Pittsburgh and **Dr. Guoan**

Li from Boston, Massachusetts. Following the morning session, a sit down lunch was served in Scaife Hall. It was a wonderful opportunity for Dr. Woo's current students and fellows to meet and learn from Dr. Woo's previous students and fellows as well as from his friends and colleagues. The first session after lunch was a departure from typical scientific sessions as it focused on sports medicine and entrepreneurial endeavors. Moderating this session were **Dr. James Wang** and **Ms. Karen Ohland** from the Metropolitan Museum of Art in New York City. Talks were delivered by **Dr. Stefano Zaffagnini** of Italy, **Ms. Tracy Vogrin** of Pittsburgh, **Mr. Gregory Carlin**,

(continued on Page 11)

Fundraising Dinner

In association with the 2002 ORS meeting, our fundraising dinner was held in Dallas, TX at the Landry's Seafood House. Our web of contacts continues to grow. As always, **Jeff Weiss, Jennifer Wayne** and **Thay Lee** all brought contingents from their laboratory. Several former MSRC fellows traveling from afar also came including **Nobuyoshi Watanabe, Yasuhiko Watanabe, Yukihsa Fukuda, Eiichi Tsuda, Kevin Hildebrand**. In addition, **Greg Carlin**, now a lawyer in North Carolina was also able to make the trip. The individual alums that are frequently seen here

(continued on Page 11)

Inside this Issue:

ORLAC Summer Grants Recipients - pg 2
2002 Research Grants Application - pg 3
News From Around the World - pg 4

Check out our updated website:

<http://www.orlac.org>

ORLAC Summer Grant Recipients

Compiled by Serena Chan Saw



Jennifer Mercer, the 2001 recipient of the Mr. & Mrs. Kwok-Chong Woo Grant

We are happy to announce this past year's ORLAC Summer Grant Recipients. Ms. Jennifer Mercer was the 2001 winner of the Mr. & Mrs. Kwok-Chong Woo Grant, which is for an undergraduate student. Ms. Mercer has been working at the Musculoskeletal Skeletal Research Center in the Department of Orthopaedic Surgery at the University of Pittsburgh since the summer of 2001 with Dr. Rich Debski. The title of her proposal was "Force Distribution and Kinematics of the Shoulder Glenohumeral Capsule in the Apprehension Position with an Applied Anterior Load".

Mr. Steven Broglio, was awarded the Mrs. Ho-Tung Cheong Grant, which is designated for a graduate student. He is a certified Athletic Trainer and is completing his M.S. in Health, Physical and Recreational Education in the School of Education at the University of Pittsburgh. Mr. Broglio's proposal was titled "The Acute Effect of Rotational Heading on Postural Measures of Instability". The work was performed in the Neuromuscular Research Laboratory at the University of Pittsburgh under the direction of Dr. Scott Lephart.

The Erin McGurk Grant for female graduate students was awarded to Ms. Kelly Shields. Ms. Shields is currently a PhD student in Biomedical Engineering under the direction of Dr. Jennifer Wayne in the Orthopaedic Research Laboratory at

Virginia Commonwealth University. Her proposal was entitled "Functional Tissue Engineering of Articular Cartilage".

The 2001 recipient of the Unnamed Clinicians Research grant was Thore Zantop, a German medical student that spent the summer of 2001 working in the Musculoskeletal Research Center. Mr. Zantop's project was entitled "Influence of High Tibal Osteotomy in a PCL Deficit Knee".

Please find the reports for Ms. Mercer and Mr. Broglio below.

Jennifer Mercer

I was grateful and honored to receive The Mr. & Mrs. Kwok-Chong Woo Grant from ORLAC for 2001. The grant enabled me to continue a research project started in the summer of 2001 at the Musculoskeletal Research Center at the University of Pittsburgh. During this research project, I was able to work with Dr. Richard Debski, Dr. Patrick McMahan, Dr. Michael Sacks, and Susan Moore, B.S., to investigate the collagen fiber architecture of the axillary pouch of the inferior glenohumeral ligament. I would like to

(continued on Page 12)

Newsletter Publisher

Serena Chan Saw, MS

Board of Directors

President, Richard Debski, PhD

Secretary, Caroline Wang, MS

Treasurer, Jamie Pfaeffle, MD, PhD

Doug Boardman, MD Thay Lee, PhD
 Patrick McMahan, MD Karen Ohland, MS
 Christos Papageorgiou, MD Masataka Sakane, MD
 Sven Scheffler, MD Jennifer Wayne, PhD

To reach us:

ORLAC
 P.O. Box 7511
 Pittsburgh, PA 15213
 phone: 412-648-1943
 fax: 412-648-2001
 email: info@orlac.org
 web site: <http://www.orlac.org>

STUDENTS, RESIDENTS, FELLOWS!!!



**2002 ORLAC
Summer Research
Grants Program**

This year, we are able to offer three opportunities for graduate, undergraduate and medical students, residents or fellows, from the United States and abroad, that you won't want to miss! ORLAC continues its Annual Summer Research Grants Program for 2002 to foster young investigators pursuing musculoskeletal research. What a great way to recognize creative endeavors of the very important members of orthopaedic laboratories!

An application consists of the following:

- 1) Name of specific award, your address, and other contact information
- 2) A one page description of the objectives including a description of the project
- 3) Transcript (applicant must be student during award period) - if applicable
- 4) Resumé or CV
- 5) Letter of recommendation from a faculty or industry member
- 6) Budget for the designated amount
- 7) Mail all application materials to:

ORLAC

Summer Research Grants Program

P.O. Box 7511

Pittsburgh, PA 15213

The Mr. & Mrs. Kwok-Chong Woo Grant

Designated for an undergraduate student to perform musculoskeletal research during the summer of 2002. Maximum budget of \$3,000.

The Mrs. Ho-Tung Cheong Grant

Designated for a graduate student or fellow (fellow, resident or medical student) to perform musculoskeletal research during the summer of 2002. Maximum budget of \$3,000.

The Erin McGurk Grant

Designated for a female graduate student to perform musculoskeletal research during the summer of 2002. Maximum budget of \$3,000.

The awardees and their mentors will be contacted by phone and mail by July 15. Checks for the designated amount of the specific award will be made out to the laboratory in which the work is to be conducted, with the understanding that the funds are to be used in support of the awardee's research.

That's all there is to it. So, what are you waiting for? - to have a great summer in research!

If you have any questions, please contact Rich Debski at (412) 648-1638 or genesis1@pitt.edu.

The application deadline for the awards is **June 14, 2002.**

News from Around the World



Compiled by Caroline Wang, Jennifer Wayne, and Serena Chan Saw

Steve Abramowitch, B.S. (MSRC: Graduate Student 1999-Present) married Deborah Brandt in Harrisburg, PA on June 2, 2001.

Doug Adams, Ph.D. (UCSD: Staff) writes that everything is status quo and that he has no new news to report.

Maria Apreleva Scheffler, Ph.D. (MSRC: Ph.D., 1995-1999) writes that after being in Boston for two years, she moved from Boston to Berlin, Germany in March to join her husband, **Sven Scheffler, M.D. (MSRC: Medical Student Fellow, 1997-1998)**. He is an orthopaedic resident at the Charite Hospital, Humboldt University.

Asbjørn Årøen, M.D. (MSRC: Orthopaedic Research Fellow, 1996-1997) is working in Lars Engebretsen's group in Norway, mainly in cartilage research along with his clinical work. He just attended the ESSKA meeting where he had the pleasure to see Dr. Woo again. He also enjoyed the symposium which Dr. Woo chaired. He and his wife Bente have a son who just celebrated his second birthday (pictured on this page).

Gustavo Azcona Arteaga, M.D. (MSRC: Orthopaedic Research Fellow, 1999-2000) sends his greetings from Mexico.

Goo Hyun Baek, M.D. (MSRC: Orthopaedic Research Fellow, 1995-1996) will be visiting the Dept. of Hand Surgery, Lund University in Malmo Sweden from May 27 to June 22. The department is well known for their extensive research on the peripheral nerve as well

as other clinical areas.

Venkatesh Balasubramanian, Ph.D. (MSRC: M.S. 1995-1998) received his Ph.D. from Louisiana Tech and was most recently a Post-Doc at Yale University in the areas of Spine and Ligament Biomechanics.

Marc Brosovitch, B.S. (MSRC: Summer Student, 1997, 1998) will be graduating from Temple University Medical School this May and will be beginning a residency in General Surgery at West Penn Hospital in Pittsburgh, PA in June.

Lance Brunton, B.S. (MSRC: Summer Student, 1997, 1998) is finishing his third year of medical school at the University of Pittsburgh and has plans to apply for orthopaedic surgery residency this year.

Greg Carlin, M.S., J.D. (MSRC: MS., Staff, 1993-1997) writes "I just completed my first year as an Associate at Alston & Bird and survived without any major screwups. Perhaps more worthy of note is that I billed more hours than any other attorney in the patent prosecution group and was the only first year associate to earn a bonus. Also, I got to work on patent applications in the aerospace and biomedical instrument fields as well as non-infringement opinions in the mechanical and business method fields. Other than that, my wife Amy and I are healthy, happy and thankful for our good fortune and wish the same for everyone else!"

Louis DeFrate, B.S. (MSRC: Undergrad, 1996-1999) is currently a graduate student at the Massachusetts Institute of Technology in the Department of Mechanical Engineering. He is working under the direction of Professor **Guoan Li (MSRC: Faculty, 1995-1998)** of Harvard Medical School at the Orthopedic Biomechanics Lab. He and his wife Marisa live near Fenway Park in Boston.

Todd Doehring, Ph.D. (MSRC: Ph.D., Post-Doctoral Fellow 1991-2001) has moved to Case Western University in Cleveland, Ohio.

Alex Feng, B.S. (MSRC: Summer Student,



Asbjørn and Bente Årøen's 2 year old son

1997) is now married as of Feb. 2, 2002 to Laura Fong (now Feng). They have moved to Albuquerque, NM.

Jon Fischer, B.S. (MSRC: Undergrad, 1999-2000) will be attending U.C. Berkeley in the fall enrolled in the Mechanical Engineering department with a full stipend.

John Gardiner, Ph.D. (Utah: Ph.D.) finished his Ph.D. in Bioengineering from the University of Utah under the supervision of Jeff Weiss this past December. This summer he will be moving to southern Orange County, CA along with his girlfriend. He is still currently looking at a couple of different employment opportunities in that area.

Rupinder Grewal, M.D. (MSRC: Orthopaedic Research Fellow, 1994-1996) is now a consultant orthopaedic and hand surgeon in Basildon Hospital in the UK. This is around 30 miles east of London. She took up this post in October 2000. After Rupi left Pitt, she returned to London to complete her senior residency and then went to Louisville, KY to do a hand fellowship at the Kliener and Kutz Institute before taking up her tenured post at Basildon. The job is quite similar to that of an Associate Professor in the USA but with no pressure to produce papers and a lot more involvement in teaching students and residents. She is really pleased that she got this job. Hopefully she will be able to meet you guys at the AAOS meeting next year - she plans to attend.

Chris Harner, M.D. (MSRC: Clinical Faculty) continues PCL biomechanics research at the MSRC advising fellows and medical students, and leading the group to win the Excellence in Research Award which will be presented at the AOSSM meeting in Orlando, FL 2002. As Medical Director of the UPMC Sports Performance Complex Dr. Harner also continues to be active educationally as Fellowship Director and through his appointment to The American Board of Orthopaedic Surgery Board of Directors.

Kevin Hildebrand, M.D. (MSRC: Orthopaedic Research Fellow, 1995-1997) is currently practicing orthopaedics in Calgary (since 1998). He has taken the position of local program chair



*Standing l-r: Jian Ying Qiu, Johnny Owen;
Seated l-r: Jennifer Wayne, Kevin Hildebrand, Greg Carlin at this year's Fundraising Dinner in Dallas, TX*

for the 5th annual Combined Orthopaedic Research Societies Meeting. This will be held in Banff, Alberta October 10-13, 2004. Mark your calendars and he hope to see you there.

Christian Jantea, M.D. (MSRC: Orthopaedic Research Fellow, 1993) has established a web-based expert system for upper extremity problems. For details please connect to <http://www.upper-extremity-conference.org>. In addition he will be organizing a cadaver workshop during "Arthroscopy of the Elbow, Nerve Compression Syndromes of the Elbow" at the Heinrich-Heine-University Duesseldorf on June 2nd 2002. For further information, please contact: jantea@uni-duesseldorf.de.

Fengyan Jia, M.D. (MSRC: Orthopaedic Research Fellow, 1999-Present) is currently a research fellow working with Dr. Woo in the MSRC in the MCL group. Together with Takatoshi Shimomura, a Japanese fellow, and Peter Tang, an orthopaedic resident in MSRC, they are working on using antisense gene therapy to improve ligament healing by down-regulating type III and V collagen gene expression. During the past year, they have used an in vitro model to test the efficacy of using antisense gene therapy in improve ligament healing. The results were encouraging, the type III/V collagen gene expression were inhibited at both mRNA and protein levels. Now they have started to set up an in vivo rat model.

Lindsay Johnson Bhargava, M.S. (MSRC:

(continued on Page 6)

News Around the World (cont'd)

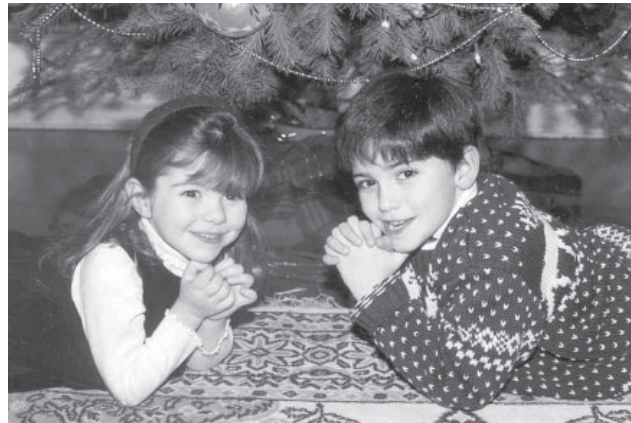
Undergrad, 1997) graduated cum laude from Duke University with B.S.E in Biomedical Engineering in May 1999. Lindsay was married to Ravi Bhargava in August 2001 - hence the new last name. She will receive her M.S.E. in Biomedical Engineering from The University of Texas at Austin in May 2002. Her Master's thesis was on "A Phenomenological Model for Estimating Energy Production in Muscle Contraction" under Marcus Pandy, PhD. Lindsay has recently accepted a job in the Engineering Leadership Program at a company called National Instruments here in Austin, TX which will begin September 2002.

Meena Joshi, M.S. (UCSD: Undergrad, MSRC: M.S., 1992-1994) and her husband Sujay welcomed the birth of their second child, a daughter named Anya Joshi Meeta who was born this past August.

Thay Lee, Ph.D. (UCSD: M.S.) continues as Director of the Orthopaedic Biomechanics Laboratory at the VA Healthcare System, Long Beach, CA. His lab consists of several faculty members, a lab manager, an administrative assistant, post-doctoral research fellows, and undergraduates.

Becky (Levine) Leibowitz, Ph.D. (MSRC: Ph.D., 1992-1996) recently transferred from GYNECARE to the Corporate Product Characterization department at ETHICON which utilizes mechanical testing, analytical chemistry, microscopy, polymer science, toxicology, and other disciplines to characterize new materials and products. She is the leader of a mechanical performance group (supervising 6 associates) and has been really enjoying getting involved in many different projects concurrently. She has also been enjoying being married (as of last June) - thus the change in her name to Leibowitz!

Bill Macaulay, M.D. (MSRC: Orthopaedic Resident, 1993-1994) has been appointed Director of the Center for Hip and Knee Replacement after being at Columbia only 2 years. He and his wife Araxi left Pittsburgh in 1998 after his superchief year and have been at Columbia for 3 years now.



Bill and Araxi Macaulay's two children

Their two children are pictured above.

Ted Manson, M.S. (MSRC: M.S., 1996-1998) is graduating medical school (Northwestern University) in May 2002 and will be starting an Orthopaedic Surgery Residency at Johns Hopkins in June.

Christina Malin, B.S. (MSRC: Undergrad, 1995-1997) will celebrate her first year wedding anniversary with husband Jay McCahill on May 18, 2002 and started her own business this past January.

Vladimir Martinek, M.D. (MSRC: Orthopaedic Research Fellow, 1998-2000) is now an Associate Professor at the Department of Orthopaedic Sports Medicine, Technical University. In addition, he has just finished his German PD "Privat Dozent "Gene Therapy of the Knee Joint" or My Habilitation". He also recently received the AFOR (Association for Orthopaedic Research) prize for his work on tissue engineering of the meniscus and cartilage and inducible gene therapy in the treatment of osteochondral defects.

Karen May-Newman, Ph.D. (UCSD: M.S. 1998) gave birth to a daughter, Janet May Newman on June 22, 2001. She is learning to crawl and is obviously eager to walk so that she can run after (or away from ?) her big brother, Alex (4). This has been her first semester back teaching full time since her baby.

Vijay Mukherjee, Ph.D. (VCU: M.S., Ph.D., 1991-1998) recently received an OREF award for his work on "Bone Graft Substitutes for Spine

Fusion in a Nicotine Exposure Model". In addition, he has developed a miniature cell-agarose gel construct which can then be compressed. This will be presented at ASME in New Orleans, 2002. He is also developing a new multi-instructor course: Introduction to Bioengineering at West Virginia University. Vijay and his wife Debjani are expecting their first child in September.

Mark Musolino, M.S. (MSRC: M.S, 1993-1996) is working on his Ph.D. in Bioengineering at the University of Pittsburgh, under the guidance of Professor Mark Redfern. He expects to finish his work (mathematical modeling of sensory integration processes involved in postural control) "sometime next year", but only time will tell. Mark is also actively pursuing a "career" in music (which might explain the open-ended timeline for completing his thesis) -- he performs on a regular basis, and has released recorded material with 2 bands this year. He also lives happily with his girlfriend of 4 years, and is very much looking forward to a few weeks of cycling and hiking in the western US this summer, starting with a week in Calgary for the World Congress of Biomechanics.

John R. Owen, P.E. (VCU) ("Johnny") continues working as a Rehabilitation Engineer in the Orthopaedic Research Laboratory at Virginia Commonwealth University with Dr. Jennifer Wayne. Johnny works primarily on basic science biomechanical research projects related to Orthopaedic Resident's education. He designs fixtures required for unique experiments, assists in the execution of tests, and coaches the Residents in proper data analysis techniques. He also assists Graduate stu-



The annual fundraising dinner in Dallax, TX

dents in their projects as needed. On a personal front, outside of work Johnny enjoys playing the trombone with his church orchestra and spending time with his wife Fran, and sons Peter (20) and William (8). His latest joy is seeing his new 1 month old grandson (Peter, Jr.).

Jamie Pfaeffle, M.D., Ph.D. (MSRC: Ph.D., 1993-1998) and his long time girlfriend Tara Beckman were married in Las Vegas on December 30, 2001.

Ted Rudy, M.A. (MSRC: Staff, 1992-2001) and his wife Ellen moved to Ohio upon retirement to get closer to family, both immediate and extended. Besides growing up in Columbus, his 8 grandchildren all live in Ohio (central, NE & NW). While living with their son and his family until their house was done (for 5 mo.), they also spent time at their vacation home in Fripp Island, SC in addition to having a partial family reunion (34 members) in Zion Nation Park, UT. After moving into their new house a week before Thanksgiving, Ted spent a month living with his oldest son's family from Mon.-Thurs. each week to finish their basement (studding, electrical work & drywall installation) to create a family room as a gift. While serving as a chaperone for his oldest grandson's High School Ski Club, Ted fell and hurt his shoulder which finished his ski season. A mystery woman skied across his tips and the next thing he knew he was flopped onto his shoulder. Meanwhile, the mystery woman never stopped. His supraspinatus has a 2 cm x 2 cm hole in it and will require surgery but first, he and Ellen are spending the first two weeks of May bicycling in the Netherlands. After his surgery, he will be in forced retirement for at least 8 weeks (no driving, no hammering, no biking). Hopefully, it will be better by ski season.

Fran Shepherd (UCSD) and her husband Chuck currently have 16 grandkids and 4 great grandbabies. She is still with Ortho Connective Tissue Biomech, the Amiel labs at UCSD, as is good old Fred the chemist. She will be celebrating her 20th anniversary at UCSD in Nov. 2003. She and Lynette still see each other at least twice a year.

(continued on Page 8)

News Around the World (cont'd)

She may follow the route of Lynette and chose retirement supplemented with part-time work by the end of next year.

Katheryne Stabile, M.S. (MSRC: M.S., 1999-2002) defended her thesis last year and graduated in December. She plans to go to medical school in the fall and is still in the process on deciding which school. Until then, she is working in the Upper Extremity and PCL groups at the MSRC. It has been a great time for their groups to get experiments done and accomplish publication goals.

David Tung, Ph.D. (UCSD: Undergrad, 1988) has accepted a position as Assistant Director of the Inflammation Research Department of Isis Pharmaceuticals in Carlsbad.

Caroline Wang, M.S. (UCSD: M.S., 1987-1989) continues to be a stay-at-home mom with her two children, ages 5.5 and 3.5 yrs. She and her family have been in Menlo Park, CA for almost 2 years now and really enjoy it there.

Jennifer Wayne, Ph.D. (UCSD: Ph.D., 1985-1990) continues as Associate Professor of Biomedical Engineering and Director of the Orthopaedic Research Laboratory at Virginia Commonwealth University. Her research in cartilage spans mechanics, repair, and imaging. Two masters students will continue on for doctoral work, Kelly Shields and Peter Liacouras. Corrie Spoon will graduate with her masters in August. Michael Araj recently joined the lab as a graduate student. Husband, Forrest "Gene" Sloan is a technical consultant for specialty fiber rope companies. Daughters Stephanie (10yo) and Nancy (7yo) continue to be the highlight of her days.

Jeff Weiss, Ph.D. (UCSD: M.S.) was awarded an NSF CAREER grant titled "In Vivo Quantification of Tissue Deformation and Growth from Medical Image Data", which will begin in September. He was also nominated by Dr. Woo for the ASME Y.C. Fung Young Investigator Award but has not heard anything yet. Finally, he is up for tenure review this fall. Jeff's lab has also grown quite a bit, he now has a post-doc, a part-time engineer, 7 grad students, and 3 undergrads, all of



Spencer Lake, John Gardiner and Jeff Weiss

whom keep him very busy.

John Xerogeanes, M.D. (MSRC: Orthopaedic Resident, 1993-1994) has been the Chief of Sports Medicine and Assistant Professor of Orthopaedic Surgery at Emory University in Atlanta for the past 3 years. During this time he has concentrated on making this a clinically viable group. He is also the Head Orthopaedist and Team Physician for Georgia Tech and Emory University. Since he covers all sports, this keeps him pretty busy.

Currently at the Musculoskeletal Research Center, Department of Orthopaedic Surgery at the University of Pittsburgh:

Dr. Savio Woo received the Carnegie Visiting Professorship sponsored by the University Court of the Universities of Scotland. The Carnegie Visiting Professorship is one of the highest honors from the highest academic institutes in Scotland. Dr. and Mrs. Woo are invited to go to Scotland in August to work with Professor Malcolm Pope at the University of Aberdeen as well as six other universities in Scotland. In addition, there will be an opportunity for Dr. Woo to present his work to a wider audience. The Carnegie Visiting Professorship provides resources in the amount of £40,000 (about \$60,000 U.S.) to allow Dr. Woo to bring along some of his graduate students and research fellows to visit the universities as well as develop collaborative projects with Dr. Pope and others.

The MSRC was very happy to welcome **Dr. Shinro Takai** and **Dr. Hiromichi Fujie**, both

ORLAC members as MSRC Visiting Professors. Both Shinro and Hiro were able to come and visit the lab and give a lecture at the MSRC's weekly seminar series. Shinro's lecture was titled "Biomechanical Properties of Growth Plate and Callus". Hiro spoke about "Application of a Robotic System to Study Joint Biomechanics".

Dr. Pat McMahon recently was named the Associate Director of the MSRC. He will be devoting 40% of his time to research and already has made a noticeable impact. This past September, the MSRC also welcomed another faculty member. **Dr. Zong-Ming Li** is the new Co-Director of the Upper Extremity Laboratory. He arrived at the MSRC via his previous position as Assistant Professor of Physical Therapy at Walsh University in Ohio. He and his wife Fang Pen recently welcomed the birth of their daughter, Vivian who was born on February 12, 2002, Chinese New Year, Year of the Horse.

The MSRC has been very successful in gaining extramural funding. **Drs. Woo and Wang** and the Functional Tissue Engineering Group was successful in a competitive renewal of the NIH Grant "MCL Healing: Interdisciplinary Studies" for \$2.1 million. This is the third time that NIH has renewed this project. The Anterior Cruciate Ligament Laboratory, under the direction of **Drs. Woo and Debski** was also successful in a competitive renewal for \$1.5 million to study *in situ* forces in the ACL. This is the fourth time that NIH has renewed this project. The Whitaker Foundation has awarded a three-year grant for \$165,600 to **Drs. Wang and Woo** in the Department of Bioengineering for the establishment of an Industrial Internship program to assist bioengineering students in achieving educational and career goals. **Dr. Wang** received a grant from CMRF for \$25,000 to study how altering mechanical stretching affects human aortic tissue and a \$240,000 grant from the Whitaker Foundation to conduct a bioengineering study of the mechanism of tendinitis. **Drs. Peter Tang and Jamie Pfaeffle** were each awarded Resident Research Grants from OREF. Nationwide, only twelve Research Grants were awarded this year.

The PCL Laboratory received two prestigious awards this year: The 2001 Hughston Award for the best original paper in the American Journal of Sports Medicine in 2000, entitled "Biomechanical Analysis of a Double-Bundle Posterior Cruciate Ligament Reconstruction" by **Chris Harner, MD, Marsie Janushek, MS, Akihiro Kanamori, MD, Masayoshi Yagi, MD, Tracy Vogrin, MS, and Savio Woo, PhD, DSc** and the Aircast Basic Science Research Award from AOSSM for the work entitled "Importance of Tibial Slope for Stability of the PCL-Deficient Knee" by **Robert Giffin, MD, Tracy Vogrin, MS, Kitty Stabile, MS, Thore Zantop, BS, Savio Woo, PhD, DSc, and Chris Harner, MD**. The ACL Laboratory received the 2002 Richard O'Connor Award from the AANA for their work entitled "Does Lateralization of Femoral Tunnel Placement Improve Anterior Cruciate Ligament Graft Function?" by **Drs. John Loh, Yukihiisa Fukuda, Eiichi Tsuda, Richard Steadman, Freddie Fu, and Savio Woo**.

Brian Campbell, B.S. was awarded a \$15,000 scholarship from the Wellington C. Carl Fund of the Pittsburgh Foundation for work on his Master's thesis project entitled "Enhancing the Quality of Wound Healing by Control of Cellular Contraction". **Dr. Wang** received the Hulda Irene Duggan Arthritis Foundation Investigator of the Year Award, a distinction given annually to the highest ranked Arthritis Investigators.

This past summer, the MSRC continued to be energized by a number of enthusiastic undergraduate students who spent thirteen weeks at the MSRC. This year's students included **Greg Frank, Nima Salari, Brian Civic, Jennifer Mercer, John Jolly, and Kevin Bell** from the University of Pittsburgh, **Bradley Stoker, James Chung, Katie Yoder** from Carnegie Mellon University, **Allison Westcott** from the University of Toledo and **Charles Vukotich** from Northwestern University.

During this past year, **Mary Gabriel, M.S.** defended her Masters thesis entitled "Determination of the strain distribution in the

(continued on Page 10)

News Around the World (cont'd)

interosseous ligament using an instrumented spatial linkage”. Mary is currently working in the MSRC as a staff research engineer. **Jennifer Zeminski, M.S.** also defended her Masters thesis entitled “Development of a Combined Analytical and Experimental Approach to Reproduce Knee Kinematics for the Evaluation of ACL Function”. Jen is currently living in Japan.

Tomoyuki Sasaki, M.D. from Hirosaki University of Japan joined the MSRC as a Post-Doctoral research fellow and is performing ACL research. **Jane Peart** is now Dr. Woo’s executive secretary and **Anthony Montanaro, B.S.** has joined our finance department.

Many students have joined the MSRC as well this past year. **Ryan Costic, B.S.** who received a degree in Bioengineering from the University of Pittsburgh has begun his Master’s research under the direction of **Dr. Richard Debski** and the Shoulder Group. **Jesse Fisk, B.S.** who earned a degree in Mechanical Engineering from Bucknell

University has joined us and has begun his studies under the direction of **Dr. Woo** in the ACL Group. Two new graduate students joined the MCL group: **Jinhong Zhu, M.D.** from Shanghai Second Medical University where she was a Ph.D. candidate and **Weiqun Yu, M.S.** from Chongqing University where he received a degree in Biomedical Engineering.

Jamie Pfaeffle, M.D., Ph.D. and **Peter Tang, M.D.** are both orthopaedic residents spending a year in the lab. Jamie completed the MD/PhD program at the University of Pittsburgh and is working on projects in the Upper Extremity Group Peter received his degree from Cornell University and is working on projects in the ACL and MCL groups Both Jamie and Peter will return to clinical duties in July.

.....
• **Send email and address updates or exciting** •
• **news to Serena by: Phone: (412) 648-2023, fax:** •
• **(412) 648-2001 or email: chanss@pitt.edu. We’d** •
• **love to hear from you!** •
.....

ORLAC Gathering at ESSKA

**Rome, Italy
April 2002**



Dr. Woo's Birthday (cont'd)

a lawyer in North Carolina, and **Ms. Erin McGurk** of Magic Venture Capital in California. The final session of the day was chaired by **Dr. Nilay Mukherjee** from West Virginia University and **Ms. Caroline Wang** from California. **Drs. Patrick McMahon, Thay Lee, Jamie Pfaeffle and Todd Doehring** spoke on the upper extremity and spine. Spirited discussions followed each presentation that represented functional musculoskeletal research from the body to the cell.

A lovely banquet at the Wyndham Garden Hotel followed the symposium. The banquet kicked off with words from **Provost James Mayer** acknowledging Dr. Woo's significant contributions to the University of Pittsburgh family. **Dr. Bruce Simon** reviewed Dr. Woo's collegiate career at the University of Washington encouraging Dr. Woo to sing an old college song that brought the house down with laughter. **Drs. Van Mow and Edmond Chao** reviewed Dr. Woo's numerous academic accomplishments and each provided special emphasis on the personal time that they had spent with Dr. Woo over the last several decades. **Drs. Freddie Fu, Minking Chyu**, and others entertained us with toasts after the meal. Especially touching were the words from Dr. Woo's family including his children, **Kirsten** and **Jonathan**, and his brother, **Dr. Savio L.C. Woo**. Dr. Woo had the final words of the evening. He illustrated the practice of his young life by the four "C"s: concern, concentration, completion, and consistency. He has always been concerned about the problems of health, the clinical treatment of certain musculoskeletal diseases, educating and stimulating young people, and quality. The second "C", concentration, he learned when he was young, since he comes from a large family, it was always very noisy and he was blessed that he learned to concentrate very well. The third "C", completion, is best exemplified by one who runs the 100 meter dash, is leading and then quits after 95 meters. That person has done nothing. The fourth and final "C", consistency, really is the key. It is very important to consistently win the big one. Dr. Woo's speech

was both thought provoking and touching. Dr. Woo concluded the evening by thanking all of those who came, some from long distances around the world, for this special evening.

Fundraising Dinner (cont'd)

included **Marcus Hollis, Eric Reindel**, and **Erin McGurk** with her spouse Ron Dietz. **Diann DeCenzo** and her husband Lou are also becoming frequent attendees.

Rich Debski was the Masters of Ceremony and began the 'formal' portion of the evening by having an individual introduce everyone seated at their table. This has become a tradition and everyone hid their heads to avoid being put on the spot but it does lead to the casual sense of fun and camaraderie. A toast with wonderful wine that **Dr. Woo** graciously provided began the meal. Rich then summarized the aims of the organization and talked about the status of our capital funds and their uses.

Meeting like this year after year has led to a continued acquaintance with former strangers - whether or not one worked directly with them, has met them at previous ORLAC dinners or just recognizes them from the literature. It changes the way one listens to the presentations at ORS and AAOS as well increases the networking web between laboratories. Be sure to put us in your plans next year.



Dr. Woo with former MSRC fellow Dr. Nobu Watanabe

Summer Awardees (cont'd)



Jennifer Mercer and her advisor Dr. Richard Debski in the Shoulder Laboratory at the MSRC.

thank the aforementioned people as well as Dr. Savio L-Y Woo and the rest of the MSRC for their support over the course of my research experience.

The purpose of my research project was to quantify the collagen fiber orientation in the axillary pouch using the small angle light scattering (SALS) technique. The glenohumeral (GH) joint is the most commonly dislocated joint in the body and has a high redislocation rate. The Inferior Glenohumeral Ligament, which contains the axillary pouch, provides the most restraint against static dislocation. The organization of the collagen fibers in this tissue could yield information about its *in vivo* function. Ultimately, the results of this study can be implemented to improve surgical repair techniques. We hypothesized that the collagen fibers in the axillary pouch of the IGHL are randomly oriented throughout the thickness of the tissue.

Previous studies have utilized the birefringent optical properties of collagen in order to quantify the orientation of fibrous tissue using SALS. The SALS device passes a 4 mW unpolarized HeNe laser beam, chosen because its wavelength (632.8 nm) is within an order of magnitude of the collagen fibril diameter, through the tissue. When the laser passes through the tissue, light is scattered perpendicular to each fiber axis, thus producing a scattered light intensity. The maximum intensity

is achieved at the angle of greatest alignment of the collagen fibers.

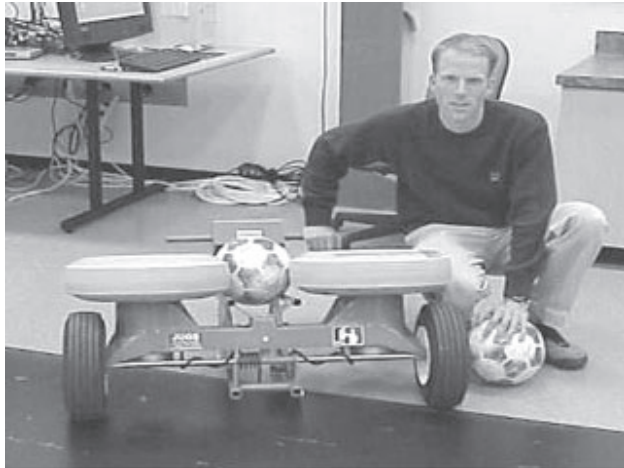
Three rectangular samples (approx. 11 x 6 mm) were excised from the axillary pouch of seven specimens. After freezing, the samples were sliced on a cryostat at 100 μm increments for mounting onto microscope slides. Approximately 10 slices per sample were collected, allowing the variability of the collagen fiber alignment to be compared throughout the depth of the tissue. The SALS device was then used to explore the collagen fiber architecture of the axillary pouch.

The collagen fibers of the axillary pouch appeared to be randomly oriented for each slice and also throughout the thickness. This random fiber orientation will affect the mechanical properties of the axillary pouch and implies that they would be similar in the directions parallel and perpendicular to the capsular ligaments. This also suggests that capsular shift procedures should treat all components of the IGHL as a continuous sheet. Specifically, proper fixation to the rim of the glenoid, in both the medial-lateral and superior-inferior direction, is necessary to restore intact capsular function.

Once again, I would like to thank ORLAC for their financial support and allowing me to complete this valuable research experience. Working at the MSRC gave the opportunity to gain hands-on experience with orthopaedic research as well as the chance to interact with people from all over the world. Finally, thank you to everyone I was able to collaborate with at the MSRC.

Steven Broglio, A.T.C.

I was greatly honored to receive the Mrs. Ho-Tung Cheong research grant from the Orthopaedic Research Laboratories Alumni Council. Their generous support of my research allowed me to purchase the necessary equipment and supplies, and provide honorariums for my subjects for the completion of my master's thesis: "The acute changes in measures of postural control following a soccer heading drill." This project was completed under the supervision of Dr. Scott Lephart, director



Steven Broglio with a JUGS Soccer Machine.
of the Neuromuscular Research Laboratory.

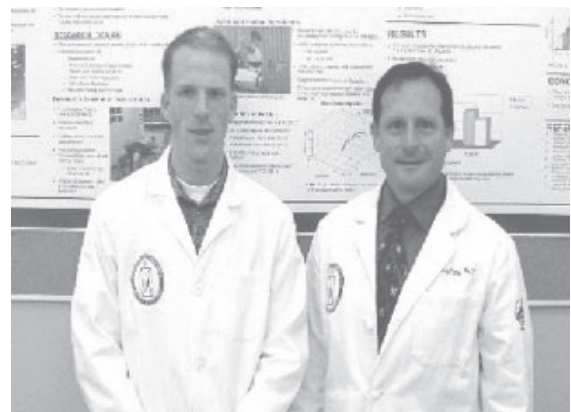
Over the last decade neuropsychological tests and postural control assessment have come to the forefront in sports related concussion assessment and research. While neuropsychological tests assess cognitive function, balance protocols are used to assess the brain's ability to integrate peripheral information properly to maintain balance. These protocols are now used to examine the potential risks of soccer heading on cerebral function. Currently, no consensus has been garnered regarding the effects of soccer heading. Some authors have reported deficits in both current and former soccer athletes, while equal numbers have seen no deficit.

The purpose of this study was to evaluate the acute affects of linear and rotational soccer heading in varsity soccer athletes through a postural control concussion assessment protocol that evaluates total sway, sway velocity, and center of pressure (COP). We randomly assigned forty male and female varsity soccer athletes from the University of Pittsburgh into one of four groups: control, linear heading, simulated rotational-heading, or rotational heading. Each subject completed a baseline postural stability assessment consisting of six conditions on day one. The same assessment was completed on day two for the control subjects and immediately following a heading drill of twenty simulated rotational headers for the simulated rotational-heading group. Subjects in the linear and rotational-heading group completed twenty

headers with an adidas soccer ball (size 5) projected toward the subject at fifty-five miles per hour from a JUGS Soccer Machine positioned eighty feet away. Immediately following the heading drill of twenty balls over a twenty minute period a second balance assessment was conducted.

Results from this study suggest no acute changes in measures of postural control in soccer athletes completing either a linear or rotational soccer heading drill of twenty balls at a fixed speed. A non-significant interaction between the group, surface, and eyes indicates that sensory integration of the balance mechanism components do not appear to be acutely affected by the heading drill. Although previous research on athletes sustaining a head injury found sensory integration deficiencies following the injury, our research indicates that linear and rotational soccer heading cause no acute deficits in postural control. Prior research that found chronic cerebral deficits in soccer athletes may have resulted from factors other than soccer heading and warrant further examination.

I would like to acknowledge the many individuals who have helped make this project a success: Scott Lephart, PhD, ATC, Kevin Guskiewicz, PhD, ATC, John Wilson, PhD, and Tim Sell, MS, PT. Without the collaborative effort put forth by these individuals and the other staff and students of the Neuromuscular Research Laboratory I would not have been able to complete this project.



Steven Broglio and his advisor, Dr. Scott Lephart

Dr. Woo's 60th Birthday Celebration



ORLAC
P.O. Box 7511
Pittsburgh, PA 15213

FORWARD & ADDRESS CORRECTION REQUESTED