

# DIMITRIOS KATSAVELIS

*Curriculum Vitae*

September 2015

**Born:** June 17, 1978 – Heraklion, Greece

**Marital Status:** Married, two children

## **Work Address:**

Department of Exercise Science & Pre-Health Professions

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## EDUCATION

### **Doctor of Philosophy**

University of Nebraska Medical Center, Omaha, NE, June 2012

**Dissertation Topic:** Virtual reality in robotic laparoscopy and gait.

**Department:** Surgery

**Major:** Biomedical Sciences

Minor: Software Engineering

### **Master of Science**

University of Nebraska at Omaha, Omaha, NE, August 2004

**Master Thesis:** The effect of fatigue on movement variability during running.

**Department:** Health, Physical Education, and Recreation

**Major:** Exercise Science

**Concentration:** Biomechanics

### **Bachelor of Science**

Aristotle University of Thessaloniki, Greece, June 2001

**Department:** Health, Physical Education, and Recreation

**Major:** Exercise Science

**Minor:** Strength, conditioning and nutrition for athletes.

**Concentration:** Sport Biomechanics

## ACADEMIC APOINTEMENTS

<b>Assistant Professor</b> (2014 - present)	Department of Exercise Science & Pre-Health Professions Creighton University Omaha, Nebraska
<b>Post Doctoral Fellow</b> (2012 - 2014)	Department of Physical Therapy Creighton University Omaha, Nebraska
<b>Research Technician</b> (2012)	Action Lab, Department of Biology Northeastern University Boston, Massachusetts
<b>Graduate Assistant</b> (2007 - 2010)	School of Health, Physical Education and Recreation University of Nebraska at Omaha Omaha, Nebraska
<b>Part-time Faculty</b> (2006 - 2009)	School of Health, Physical Education and Recreation University of Nebraska at Omaha Omaha, Nebraska
<b>Volunteer Coach</b> (2005 - 2006)	Track and Field, Division I Indiana University Bloomington, Indiana
<b>Graduate Assistant</b> (2004 - 2006)	School of Health, Physical Education and Recreation Indiana University Bloomington, Indiana
<b>Graduate Assistant</b> (2002 - 2004)	School of Health, Physical Education and Recreation University of Nebraska at Omaha Omaha, Nebraska
<b>Lab Assistant</b> (2000 - 2002)	Department of Science in Physical Education and Sports Aristotle University of Thessaloniki Thessaloniki, Greece

## AWARDS

Graduate studies Research Fellowship from the University of Nebraska Medical Center, 2008 - 2010.

Tuition remission thru the Graduate Studies office (UNMC), 2008 - 2010.

Award for oral presentation during the UNO Centennial Celebration Research Fair, 2009.

Grant-in-aid for traveling cost from UNO Dean's office, 2007-2010.

Graduate Assistantship in the Biomechanics Lab at the University of Nebraska at Omaha, 2007 - 2008.

Graduate Assistantship in the Department of Kinesiology at the Indiana University, 2004 - 2006.

Who is Who among American students, 2004.

Graduate Assistantship in the Biomechanics Lab at the University of Nebraska at Omaha, 2002 - 2003.

Athlete of the year in Heraklio, Greece (National Junior Team in track and field), 1997 & 1998.

## PUBLICATIONS

### PUBLISHED MANUSCRIPTS

1. Kaufmann, C., Simet, J., Ratliff, K., **Katsavelis, D.**, and Berg, K. (2008). Pacing pattern and physiological responses to a five minute maximal exercise bout. *Journal of Strength and Conditioning Research*, 22(5):1610-6.
2. Brown-Clerk, B., Siu, K-C., **Katsavelis, D.**, Lee, I., Oleynikov, D., Stergiou, N. (2009). Validating advanced robot-assisted laparoscopic training task in virtual reality. *Studies in Health Technology and Informatics*, 132:45-9.
3. **Katsavelis, D.**, Siu, K-C., Brown-Clerk, B., Lee, I.H., Oleynikov, D. and Stergiou, N. (2009). Validated robotic laparoscopic surgical training in virtual reality environment. *Surgical Endoscopy*, 23(1):66-73.
4. Potach, D.H., **Katsavelis, D.**, Karst, G.M., Stergiou, N. (2009). The effects of a plyometric training program on the latency time of the quadriceps femoris and gastrocnemius short-latency responses. *The Journal of Sports Medicine and Physical Fitness*, 49(1):35-43.
5. **Katsavelis, D.**, Mukherjee, M., Decker, L., Stergiou, N. (2010). Variability of lower extremity joint kinematics during backward walking in a virtual environment. *Nonlinear dynamics, psychology, and life sciences*, 14(2):165-78.
6. **Katsavelis, D.**, Mukherjee, M., Decker, L., Stergiou, N. (2010). The effect of virtual reality on gait variability. *Nonlinear dynamics, psychology, and life sciences*, 14(3):239-56.
7. Mukherjee, M., Siu, K.C., **Katsavelis, D.**, Fayad, P., Stergiou, N. (2011). The influence of visual perception of self-motion on locomotor adaptation to unilateral limb loading. *Journal of Motor Behavior*, 43(2):101-11.
8. **Katsavelis, D.**, Threlkeld, A.J. (2014). Quantifying thigh muscle co-activation during isometric knee extension contractions: within- and between-session reliability. *Journal of Electromyography and Kinesiology*, 24(4): 502-7.
9. Zuniga J, **Katsavelis, D.**, Peck J, Stollberg, J., Petrykowski, M., Carson, A., Fernandez, C. (2015). Cyborg best: a low-cost 3d-printing prosthetic hand for children with upper-limb differences. *BMC Res Notes*. 8;10.
10. Pisimisis, G.T., **Katsavelis, D.**, Mandviwala, T., Barshes, N.R., Kougiyas, P. (2015). Common carotid artery peak systolic velocity ratio predicts high-grade common carotid stenosis. *Journal of Vascular Surgery*, [Epub]

### PUBLISHED ABSTRACTS IN REFERRED JOURNALS

1. **Katsavelis, D.**, Kyvelidou, A., Stavropoulos, N., and Stergiou, N. (2006). Neuromuscular-induced fatigue increases running kinematic variability. *Journal of Sport and Exercise Psychology*, 28:S97-98.

2. Brown-Clerk, B., Siu, K-C, **Katsavelis, D.**, Lee, I.H., Oleynikov, D., Stergiou, N. (2007). Electromyographic Activity Determines Task Difficulty for Robotic Laparoscopic Training Programs. *Journal of Biomechanics*, 40:S643.
3. Lee, Y.K., Iqbal, A., **Katsavelis, D.**, Thompson, J., McBride. (2007). Long term outcome of laparoscopic bariatric surgery in elderly patients at university setting. *Surgery for Obesity and Related Diseases*, 3(3):311-312.
4. **Katsavelis, D.**, Siu, K-C., Brown-Clerk B., Lee, I.H. Oleynikov, D., Stergiou, N. (2007). Learning robotic surgical skills with a virtual reality environment. *Journal of Sport and Exercise Psychology*, 29:S91-92
5. Siu, K-C., Lee, I.H., Brown-Clerk, B., **Katsavelis, D.**, Oleynikov, D., Stergiou, N. (2007). Nonlinear analysis validate the need to learn surgical skill. *Journal of Sport and Exercise Psychology*, 29:S130.
6. **Katsavelis, D.**, Decker, L., Kochi, N., Stergiou, N. (2008). Effect of optic flow produced by virtual reality on gait variability. *Journal of Sport and Exercise Psychology*, 30:S97-98.
7. Kochi, N., Decker, L., **Katsavelis, D.**, Stergiou, N. (2008). The minimum number of data points required to compute approximate entropy for gait data. *Journal of Biomechanics*, 41:S504

#### **ORAL PRESENTATIONS – INTERNATIONAL**

1. **Katsavelis, D.**, Stergiou, N., and Korellis, G. The effect of fatigue on running mechanics. *Presented at the 12<sup>th</sup> International Congress on Physical Education and Sport*. Komotini, Greece, May, 2004.
2. **Katsavelis, D.**, Blanke, D., and Stergiou, N. The value of gait analysis: a bibliographical evaluation. Presented at the 12<sup>th</sup> International Congress on Physical Education and Sport. Komotini, Greece, May, 2004.
3. **Katsavelis, D.**, and Kurz, M.X. Effect of athletic shoes on altering muscular strength due to sensory feedback and its relationship with lower extremity injuries. *Presented at the 12<sup>th</sup> International Congress on Physical Education and Sport*. Komotini, Greece, May, 2004.
4. **Katsavelis, D.**, Berg, K., and Korellis, G. EMG activity of lower limb muscles during a maximal cycling test. *Presented at the 12<sup>th</sup> International Congress on Physical Education and Sport*. Komotini, Greece, May, 2004.

5. **Katsavelis, D.** Nonlinear analysis: theoretical background and applications. *Invited lecture at the Winter School in Biomechanics*, Sao Paolo, Brazil, July, 2009.
6. **Katsavelis, D.** Movement Variability and the Use of Nonlinear Tools: from theory to applications. *Workshop at 13<sup>th</sup> Congress of the Brazilian Society of Biomechanics*, Sao Paolo, Brazil, July, 2009.
7. **Katsavelis, D.** Movement Variability in the study of robotic-assisted surgery and animal locomotion. *Keynote lecture at 13<sup>th</sup> Congress of the Brazilian Society of Biomechanics*, Sao Paolo, Brazil, July, 2009.
8. **Katsavelis, D.** The future of biomechanics. *Keynote lecture at 13<sup>th</sup> Congress of the Brazilian Society of Biomechanics*, Sao Paolo, Brazil, July, 2009.

#### **ORAL PRESENTATIONS – NATIONAL**

9. Siu, K-C., Brown-Clerk, B., **Katsavelis, D.**, Lee, I.H., Oleynikov, D. and Stergiou, N. Validated robotic laparoscopic surgical training in virtual reality environment. Presented at the *Annual Meeting of the Society of American Gastrointestinal Endoscopic Surgeons*, Las Vegas, Nevada, April, 2007.
10. Siu, K-C., Brown-Clerk, B., **Katsavelis, D.**, Lee, I.H., Oleynikov, D., Stergiou, N. Validating advanced robot-assisted laparoscopic training task in virtual reality. Presented at the *Medicine Meets Virtual Reality 16<sup>th</sup> Annual Meeting*, Long Beach, California, January 2008.
11. **Katsavelis, D.**, Decker, L., Kochi, N., Stergiou, N. Effect of optic flow produced by virtual reality on gait variability. Presented at the *North American Society for the Psychology of Sport and Physical Activity Conference*, Niagara Falls, Canada, June, 2008.
12. Mukherjee, M., **Katsavelis, D.** Virtual reality technology in human locomotion. Presented at the *4<sup>th</sup> Annual Nebraska Research and Innovation Conference*, Lincoln, Nebraska, October 2008.
13. Siu, K-C., **Katsavelis, D.** Simulation of advanced robotic surgical technology. Presented at the *4<sup>th</sup> Annual Nebraska Research and Innovation Conference*, Lincoln, Nebraska, October 2008.
14. **Katsavelis, D.**, Rickertsen, B., Stergiou, N. (2009). Nano Legends: an interactive virtual reality game induces high level of physical activity. Presented at the *Medicine Meets Virtual Reality 17<sup>th</sup> Annual Meeting*, Long Beach, California, January 2009.

15. **Katsavelis, D.**, Stergiou, N. Nano Legends: an interactive virtual reality game induces high level of physical activity. Presented at the *Centennial Celebration of Student Research and Creative Activity*, Omaha, Nebraska, March 2009.
16. **Katsavelis, D.** Human computer interaction: the effect of virtual reality on human movement. Presented at the *5<sup>th</sup> Annual Nebraska Research and Innovation conference*, Omaha, Nebraska, September, 2009.
17. Koutakis, P., **Katsavelis, D.**, Myers, S.A., Johanning, J.M., Pipinos, I.I., Stergiou, N. Walking velocity does not affect joint powers in peripheral arterial disease. Presented at the *15th Annual Gait and Clinical Movement Analysis Society Conference*, Miami, Florida, May 2010.
18. Threlkeld, A.J., **Katsavelis, D.**, Huben, N., Grindstaff, T., Givens, D., Bertoni, J. Withdrawal of Anti-Parkinson's medication suppresses central activation of the quadriceps in people with Parkinson's disease-related fatigue. Presented at the *Combined Section Meeting*, Indianapolis, Indiana, February 2015.
19. Pisimisis, G.T., **Katsavelis, D.**, Bechara, C.F., Barshes, N.R., Kougias, P. Common carotid artery peak-systolic velocity ratio predicts high-grade common carotid stenosis. Presented at the *43<sup>rd</sup> Annual Symposium of the Society for Clinical Vascular Surgery*, Miami, Florida, April 2015.
20. Threlkeld, A.J., **Katsavelis, D.**, Kogler, K., Bentele, B., Ruminski, E., Huben, N. Heel Impacts as a Weight Bearing Exercise for Osteoporosis and Osteopenia. Accepted for podium presentation at the *APTA Combined Section Meeting*, Anaheim, California, February 2016.
21. **Katsavelis, D.**, Haney, J., Nun, L., Threlkeld, A.J. Persistence of motor unit firing in people with Parkinson's disease-related fatigue. Accepted for podium presentation at the *APTA Combined Section Meeting*, Anaheim, California, February 2016.

## INVITED PRESENTATIONS

1. **Katsavelis, D.** The value of virtual reality for the study of human locomotion. *Invited lecture at the University of Ioannina Medical Center*, Ioannina, Greece, December, 2007.

## POSTERS

1. **Katsavelis, D.**, Kyvelidou, A. and Stergiou, N. The effect of fatigue on movement variability during running. Presented at the *30<sup>th</sup> Annual Meeting of the American Society of Biomechanics*, Blacksburg, Virginia, September, 2006.

2. **Katsavelis, D.**, Kyvelidou, A., Stavropoulos, N., and Stergiou, N. Neuromuscular induced fatigue increases running kinematic variability. Presented at the *North American Society for the Psychology of Sport and Physical Activity Conference*, Denver, Colorado, June, 2006.
3. Lee, Y.K., Iqbal, A., **Katsavelis, D.**, Thompson, J., and McBride, C. Oleynikov. Long term outcome of laparoscopic bariatric surgery in elderly patients at university setting. Presented at the *Annual Meeting of the American Society of Bariatric Surgery*, San Diego, California, June, 2007.
4. **Katsavelis, D.**, Siu, K-C., Brown-Clerk B., Lee, I.H. Oleynikov, D., Stergiou, N. Learning robotic surgical skills with a virtual reality environment. Presented at the *North American Society for the Psychology of Sport and Physical Activity Conference*, San Diego, California, June, 2007.
5. Siu, K-C., Lee, I.H., Brown-Clerk, B., **Katsavelis, D.**, Oleynikov, D., Stergiou, N. Nonlinear analysis validate the need to learn surgical skill. Presented at the *North American Society for the Psychology of Sport and Physical Activity Conference*, San Diego, California, June, 2007.
6. Brown-Clerk, B., Siu, K-C., **Katsavelis, D.**, Lee, I.H., Oleynikov, D., and Stergiou, N. Electromyographic activity determines task difficulty for robotic laparoscopic training programs. Presented at the *International Society of Biomechanics Conference*, Taipei, Taiwan, July, 2007.
7. Siu K.-C., Brown-Clerk B., Lee I.H., **Katsavelis D.**, Oleynikov D., Stergiou N. The Negative Impact of Noisy Environment on Robotic Surgery. Presented at the *Neuroscience 37th Annual Meeting*, San Diego, California, 2007.
8. Mukherjee, M., **Katsavelis D.**, Stergiou N. The effect of virtual reality on locomotor adaptation. Presented at the *Neuroscience 38th Annual Meeting*, Washington D.C., 2008.
9. **Katsavelis, D.**, Mukherjee, M., Decker, L., Stergiou, N. Lower extremity joint kinematic variability as produced by virtual reality during backward walking. Presented at the *Gait and Clinical Movement Analysis Society*, Denver, Colorado, March 2009.
10. Mukherjee, M., **Katsavelis, D.**, Stergiou, N. The effect of virtual reality on locomotor adaptation. Presented at the *Centennial Celebration of Student Research and Creative Activity*, Omaha, Nebraska, March 2009.

11. Siu, K.C., Mukherjee, M., **Katsavelis, D.**, Chien, J.H., Stergiou, N. Walking in a moving corridor with variable width size affects step width control. Presented at the *15th Annual Gait and Clinical Movement Analysis Society Conference*, Miami, Florida, May 2010.
12. **Katsavelis, D.**, Mukherjee, M., Koutakis, P. The effect of virtual reality on human locomotion. Presented at the *4th Elembio Annual Conference*, Ioannina, Greece, June 2010.
13. **Katsavelis, D.**, Mukherjee, M., Koutakis, P. Blindfolded locomotion on a circular path: testing motor memory and path integration. Presented at the *4th Elembio Annual Conference*, Ioannina, Greece, June 2010.
14. Siu, K.C., Chien, J.H., Mukherjee, M., **Katsavelis, D.**, Park, S.H., Stergiou, N. Walking in a moving virtual corridor with variable width affects step width variability. Presented at the *Neuroscience 40th Annual Meeting*, San Diego, California, November 2010.
15. Baumert, L.A., Gillen, A.B., **Katsavelis, D.**, Morton, S.K., Threlkeld, A.J. Work required to produce quadriceps fatigue using an isometric exercise protocol: a comparison of younger and older adults. Presented at the *Annual St. Albert's Day*, Omaha, Nebraska, April 2013.
16. **Katsavelis, D.**, Morton, S.K., Threlkeld, A.J. Within- and between-session reliability for the quantification of the thigh muscles co-activation index during isometric contractions. Presented at the *37th Annual Meeting of the American Society of Biomechanics*, Omaha, Nebraska, September 2013.
17. Morton, S.K., **Katsavelis, D.**, Grindstaff, T.L., Threlkeld, A.J. Quadriceps fatigue affects central nervous system activation. Presented at the *37th Annual Meeting of the American Society of Biomechanics*, Omaha, Nebraska, September 2013.
18. Grindstaff, T.L., **Katsavelis, D.**, Morton, S.K., Threlkeld, A.J. Between session reliability of quadriceps percent voluntary activation and force measures in healthy participants. Presented at the *37th Annual Meeting of the American Society of Biomechanics*, Omaha, Nebraska, September 2013.
19. **Katsavelis, D.**, Morton, S.K., Grindstaff, T.L., Threlkeld, A.J. The effect of dopaminergic medication on muscle performance in people with Parkinson's disease-related fatigue. Presented at the *3rd World Parkinson Congress*, Montreal, Canada, October 2013.
20. Threlkeld, A.J., **Katsavelis, D.**, Morton, S.K., Grindstaff, T.L. The effect of dopaminergic medication on muscle performance in people with Parkinson's disease-related fatigue. Presented at the *3rd World Parkinson Congress*, Montreal, Canada, October 2013.



21. Threlkeld, A.J., **Katsavelis, D.**, Faulkner, M.A., Huben, N.B. The effect of walking speed and dopaminergic medication on knee muscle performance in people with Parkinson's disease-related fatigue. Presented at the 7<sup>th</sup> *World Congress of Biomechanics*, Boston, Massachusetts, July 2014.
22. **Katsavelis, D.**, Huben, N.B., Threlkeld, A.J. Knee extension co-activation index reliability and variability during contractions depends on the combination of muscle segments analyzed. Presented at the 7<sup>th</sup> *World Congress of Biomechanics*, Boston, Massachusetts, July 2014.
23. Grindstaff, T.L., Burggraff, D., Whitmore, B.L., Morton, S.K., Palimenio, M.R., **Katsavelis, D.** Transcutaneous electrical nerve stimulation does not impact clinical measures of athletic performance. Presented at the *Combined Section Meeting*, Indianapolis, Indiana, February 2105.
24. Zuniga, J., **Katsavelis, D.**, Carson, A., Petrykowski, M., Ploutz-Snyder, L. Cyborg Beast: A low-Cost 3D Printed Prosthetic hand for children with upper limb reduction deficiency. Accepted for poster at the NASA Human Research Program, Houston, Texas, January 2015.
25. Knight, E., Smith, R., Than, N., Nun, L., Sikora, A., Eckerson, J, **Katsavelis, D.** The effect of fatigue on tibial acceleration during an incremental run. *Creighton University Honors Day*, Omaha, Nebraska, April, 2015.
26. Giordano, K., Nishiki, D., Sado, T., Mikkelsen, B., Zuniga, J., **Katsavelis, D.** Changes in running mechanics during incremental runs pre and post fatigue. *Creighton University Honors Day*, Omaha, Nebraska, April, 2015.

## PROFESSIONAL AFFILIATIONS

- American Society of Biomechanics (present)
- International Society of Biomechanics (present)
- Greek Society of Biomechanics (present)
- Gait and Clinical Movement Analysis Society (past)
- North American Society for the Psychology of Sport and Physical Activity (past)

## GRANTS

### PRIMARY INVESTIGATOR

- The effect of virtual reality on movement variability. Grantor: Graduate Studies Research Fellowship (University of Nebraska Medical Center), 2008-2010, \$45,000 + tuition.

### CO-INVESTIGATORY/SUPPORTING PERSONNEL

- Co-Investigator | Low-Cost 3D Printed Prosthetic Devices for Children and Adults with Upper Limb Differences. PI: Jorge Zuniga. Grantor: NASA Nebraska EPSCoR Research Mini-Grant, 2014-2015, \$19,896.
- Co-Investigator | Differentiation of central versus peripheral fatigue in Parkinson's disease. PI: A. Joseph Threlkeld. Grantor: National Institute of Health (R15), 2012-2015, \$360,981.
- Supporting Personnel | New robotic surgical tools for minimal access surgery. PI: Dmitry Oleynikov. Grantor: Nebraska Research Initiative, 2004-2008, \$1,185,852.
- Supporting Personnel | A biomedical device for prognostic and diagnostic measures of pathological locomotive bio rhythms. PI: Nick Stergiou. Grantor: Nebraska Research Initiative, 2004-2008, \$387,917.
- Supporting Personnel | The Nebraska Biomechanics Core Facility: An emerging core facility. Grantor: Nebraska Research Initiative, 2007-2008, \$621,980.
- Supporting Personnel | Child's physical activity/cancer prevention video game. PI: Bryan Rickertsen. Grantor: National Institute of Health (P43), 2006-2007, \$81,000.
- Co-Investigator | Measurement of pectoralis minor length in women diagnosed with breast cancer: reliability, validity and clinical application. PI: Shana Harrington. Grantor: Haddix Award, Creighton University, 2015-2016, \$15,000.

## **SERVICE**

### **PEER REVIEWER**

- Medicine and Science in Sports and Exercise
- International SportMed Journal
- Journal of Sports Medicine
- Journal of Applied Biomechanics
- Developmental Psychobiology
- Motricidade

### **CONSULTING**

- Scientific consultant of Orthopedic Sports Medicine Center of Ioannina (Greece, 2007-2010).
- Scientific consultant for the “Locomotion” team located at the National Museum of Natural History of Paris (France, 2009-2010).

### **RECRUITING**

Presentation for community education and recruitment:

- Retirement communities (Sunridge Village, Omaha, 2009).
- Dance groups (UNO, 2009 & 2015).
- Parkinson’s disease symposiums (2012 & 2013).
- Parkinson’s disease support groups (Bellevue, 2013).
- Parkinson’s disease community events (walk-a-thon and hand-in-hand).

### **VOLUNTEERING**

- Session technician for the 37<sup>th</sup> Annual Meeting of the American Society of Biomechanics, (Omaha, 2013).

### **OTHER SERVICES**

- Gait analysis for runners: offered assessments to help determine the best type of running shoe. (University of Nebraska at Omaha, 2002-2004).
- Mechanical Hand Project: Ongoing collaboration with Dr. Zuniga to design and construct low cost mechanical hands for children with hand differences (Creighton University, 2012-present).

## TECHNICAL SKILLS

### 1. Video Equipment & Software

Motion Analysis Optoelectronic Systems (Vicon, Qualisys, Motion Analysis, NDI)  
Orthotrak video analysis software  
Visual 3D

### 2. Force/Timing Measurement

Kistler Force Platform system, model 9281B  
Accelerometers (PCB, Crossbow & Gulf Coast)  
Noraxon, Stride Analyzer  
Gait-O-Gram footswitch devices (custom-made hardware)  
Tekscan pressure and force footswitch system  
Photo-cells (custom-made device)

### 3. Muscle Function and Electrophysiology

Biodex & Cybex Isokinetic Dynamometers  
Surface and intramuscular EMG systems (Delsys, Motion Lab & Biopac)

### 4. Exercise Physiology Related Instrumentation

Graded Exercise Testing  
Treadmill/Cycle ergometer  
Electrocardiograph (EKG)  
Body Composition – Skinfold caliper, Submersion tank  
Pulmonary Function – Collins 13.5 liter spirometer with kymograph, Neumocheck  
Lactate measures

### 5. Computer Programming/Software Experience

Microsoft Office – Word, Excel, Access, PowerPoint  
Chaos Data Analyzer (for nonlinear analysis) – Nonlinear Analysis Software (custom-made)  
Statistical software (SPSS, Minitab & Matlab)

### **Computer programming experience in:**

Matlab, C, C++, Java, Scheme, Visual Basic, Labview, Fortran and OpenGL