OMB No. 0925-0001 and 0925-0002 (Rev. 11/16 Approved Through 10/31/2018)

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FIVE PAGES.**

NAME: Alexander Jacob Rosenberg

eRA COMMONS USER NAME (credential, e.g., agency login): ALEXROSENBERG

POSITION TITLE: Postdoctoral Fellow

EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)

| INSTITUTION AND LOCATION | DEGREE(if applicable) | Start DateMM/YYYY | Completion DateMM/YYYY | FIELD OF STUDY |
| --- | --- | --- | --- | --- |
| Ithaca College, Ithaca NY | B.S. | 08/2005 | 12/2009 | Exercise Science |
| University of Illinois at Chicago | M.S. | 08/2010 | 05/2012 | Exercise Physiology |
| University of Illinois at Chicago | Ph.D | 08/2012 | 12/2017 | Applied Cardiovascular Exercise Physiology |
| University of North Texas Health Science Center | PostdoctoralFellowship | 01/2018 | Present | Cardiovascular & Cerebrovascular Physiology |

1. **Personal Statement**

My primary career goals are to become an independent research scientist and educator, obtaining a faculty position at a top-tier research university in the field of cardiovascular exercise physiology. I aim to contribute towards minimizing cardiovascular health disparities in our aging population by conducting high quality research focused on cerebrovascular physiology and cognitive health. My education at the University of Illinois at Chicago in the Department of Kinesiology, Nutrition, and Rehabilitation under the mentorship of Drs. Tracy Baynard and Bo Fernhall has deepened my understanding and interest in applied cardiovascular physiology as it pertains to special populations. In particular, I am interested in how to reduce the risk of cardiovascular events through different treatment strategies, such as exercise and lifestyle modifications, antioxidant supplementation, and dietary interventions. In my capacity as a graduate student I was involved in a wide range of applied physiology projects where we sought to understand how the cardiovascular system responds to different physical and physiological stressors, and ultimately focused on their impact on human health and function (please refer to the Doctoral Dissertation and Research Experience section for the specific details). I gained extensive experience in working with special populations, including individuals with Down Syndrome, Multiple Sclerosis, Parkinson’s Disease, heart failure, chronic kidney disease, and aged individuals (both healthy and diseased). I have extensive experience with performing ultrasonography measures of the heart and peripheral vasculature, cognition assessments, cardiopulmonary testing, vascular endothelial function measurement via brachial flow mediated dilation, cerebral blood velocity measures via transcranial Doppler, aerobic and anaerobic fitness assessments and training interventions, and gait analysis with these populations. Furthermore, I focused on an aging population in developing my doctoral project, “The effects of age and sex on cerebral blood velocity following an acute bout of resistance exercise”. Therefore, my scientific research experience and technical ability will allow me to succeed at conducting and completing the proposed postdoctoral fellowship project with Dr. Caroline Rickards at the University of North Texas Health Science Center. As described in the proposed training, I aim to develop a functional test to assess cerebral vascular health by elucidating the relative contribution of endothelial-mediated dilation from myogenic and neurogenic control of the cerebral vasculature. This approach is highly innovative and will be the foundation for future studies on aging and cerebrovascular function as well as setting the stage for my independent studies following my post-doctoral training. The following four publications highlight my experience and qualifications for the proposed project:

* **Rosenberg, A.J.,** Lane, AD., Wee, SO., White, DW., Hilgenkamp, T., Fernhall, B., Baynard, T. Healthy Aging and Carotid Performance: Strain Measures and Beta-Stiffness Index. *Hypertens Res*. 2018; Epub July 3 (PMID 29968848)
* **Rosenberg, A.J.,** Lane, A.D., Bunsawat, K., Wee, S.O., Kappus, R.M., Baynard, T.*,* Fernhall, B. The influence of sex and age on arterial function in response to an acute inflammatory stimulus [Abstract - Oral Presentation]. *Artery Research*, Vol. 12, 2015, Page 46, ISSN 1872-9312.
* Kappus, R.M., Bunsawat, K., **Rosenberg, A.J.,** Fernhall, B. No Evidence of Racial Differences in Endothelial Function and Exercise Blood Flow in Young, Healthy Males Following Acute Antioxidant Supplementation. *Int J Sports Med.* 2017; 38 (3):193-200 (PMID 28219102).
* Schroeder, E.C., **Rosenberg, A.J.,** Hilgenkamp, T.I., White, D.W., Baynard, T., Fernhall, B. Effect of Upper Body Position on Arterial Stiffness: Influence of Hydrostatic Pressure and Autonomic Function. *J Hypertens*. 2017; 35 (12):2454-2461 (PMID 28704262).
1. **Positions and Honors**

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| --- | --- | --- | --- | --- | --- |
| **ACTIVITY/OCCUPATION** | **STARTDATE MM/YYYY** | **END DATE MM/YYYY** | **FIELD** | **INSTITUTION/COMPANY** | **SUPERVISOR/EMPLOYER** |
| Fitness coordinator/Personal Trainer | 07/2009 | 07/2010 | Exercise Science | City Health Club | Hank Cesari (Owner) |
| Curves Staff Member/Personal Trainer | 07/2009 | 07/2010 | Exercise Science | Curves | Jessica MacDonald (Owner) |
| YMCA Fitness Staff | 07/2009 | 07/2010 | Exercise Science | YMCA | Bethany Tennant, Ph.D. |
| Ithaca College Strength and Conditioning Coach | 08/2009 | 05/2010 | Exercise Science | Ithaca College | Becky Robinson, CSCS |
| Graduate Teaching Assistant | 08/2010 | 05/2012 | Human Anatomy and Physiology | University of Illinois at Chicago | Mary Lou Barither, Ph.D. |
| High School/College Seminars Laboratory Instructor | 08/2011 | 05/2012 | Human Anatomy and Physiology | University of Illinois at Chicago | Jane Marone, MD |
| Graduate Teaching Assistant | 08/2012 | 05/2013 | Muscle Physiology | University of Illinois at Chicago | Craig Horswill, Ph.D. |
| Graduate Teaching Assistant | 08/2013 | 05/2014 | Advanced Exercise Physiology | University of Illinois at Chicago | Jeremy Fransen, Ph.D. |
| Head Graduate Teaching Assistant | 08/2014 | 05/2016 | Introduction to Kinesiology | University of Illinois at Chicago | Tracy Baynard, Ph.D. |
| Graduate Research Assistant | 05/2016 | 12/2017 | Kinesiology, Nutrition, and Rehabilitation | University of Illinois at Chicago | Tracy Baynard, Ph.D. |
| Post-doctoral Fellow | 01/2018 | Present | Cardiovascular and Metabolic Physiology | University of North Texas Health Science Center | Caroline Rickards, Ph.D. |

**Academic and Professional Honors**

2018 Federation of American Societies for Experimental Biology (FASEB) Postdoctoral Preparation Institute Travel Award

2018 UNTHSC Research Appreciation Day - 1st Place for Postdoctoral Fellow Oral Presentation

2018 UNTHSC Postdoctoral Research Associate Travel Award

2017 Artery Conference (Pisa, Italy) Bursary Award Recipient

2017 Graduate College’s Student Presenter’s Travel Award, University of Illinois at Chicago, IL

2017 Health Professional Student Council Travel Grant Award, University of Illinois at Chicago, IL

2016 Artery Conference (Copenhagen, Denmark) Bursary Award Recipient

2016 North American Artery Young Investigator Award Recipient

2016 ACSM Annual Conference - Student Moderator for Cardiac II Thematic Poster Session

2016 Health Professional Student Council Travel Grant Award, University of Illinois at Chicago, IL

2016 Department of Kinesiology & Nutrition Travel Grant, University of Illinois at Chicago, IL

2015 North American Artery Young Investigator Award Finalist

2015 Certificate of Recognition for Graduate Student Research, University of Illinois at Chicago, IL

2015 Health Professional Student Council Travel Grant Award, University of Illinois at Chicago, IL

2015 Graduate College’s Student Presenter’s Travel Award, University of Illinois at Chicago, IL

2014 Department of Kinesiology & Nutrition Travel Grant, University of Illinois at Chicago, IL

2010-2012 Honor Society Member, University of Illinois at Chicago, IL

2007-2009 Empire Eight Conference President List of Academic Achievement, Ithaca College, NY

2007-2009 Captains counsel of wrestling team, Ithaca College, NY

2005-2009 Presidential Scholarship, Ithaca College, NY

**Professional Membership**

2018 - Present Texas Chapter American College of Sports Medicine member

2014 - Present American Heart Association

2013 - Present American Physiological Society

2013 - Present North American Artery Society

2012 - 2017 Midwest Chapter American College of Sports Medicine member

2010 - Present American College of Sports Medicine (ACSM)

2008 - Present Member of the National Strength and Conditioning Association

1. **Contributions to Science**

***Effects of Age and Sex on Cerebral Blood Velocity Regulation Following Hypertensive Stimulus***

Total cerebral blood flow decreases with age, while systemic blood pressure and cerebral blood velocity pulsatility increase, leading to a greater prevalence of brain lesions, disability and cognitive impairment. Sex-related differences have also been observed in cerebral blood velocity and blood pressure regulation throughout the aging process. If a functional bioassay could be established to assess cerebral autoregulation impairment, an early-stage intervention strategy could potentially be designed to reduce cerebrovascular event risk. Therefore, studying how large pressure increases [via acute resistance exercise (RE)] influence cerebrovascular dynamics in young and older adults is clinically relevant. The central findings of our studies indicates potential cerebrovascular dysfunction with aging; compared to young adults, older adults had a greater increase in cerebral blood velocity pulsatility and a greater transmission of pulsatile velocity from the peripheral circulation to the cerebral circulation immediately following the high pressure stimulus. However, the attenuated mean cerebral blood velocity response immediately after the stimulus could also be viewed as a form of resiliency because the older adults had a greater increase in cerebral resistance, potentially protecting cerebral tissue from hyperperfusion. Additionally, our findings suggest possible sex differences in the transmission of pulsatile velocity to the brain during recovery following an acute hypertensive stress. Older females demonstrated more efficient and intact cerebral autoregulation compared to age-matched males, failing to support the hypothesis that estrogen loss with age causes disruptions in cerebral hemodynamics and cerebral autoregulation. Overall, the age and sex differences in cerebrovascular function in response to a high-pressure stimulus appear to have physiological implications. Further exploration of cerebral dynamics with aging in males and females is required to determine the implications in the detection, treatment and prevention of cerebrovascular disease. This work was my dissertation project and I served as principal investigator of this study. I have presented our data at multiple national and international conferences (both oral and in poster format). I received recognition for this project as the recipient of the Young Investigator Award at the 2016 North American Artery Conference. I also mentored a more junior graduate student who received the best abstract award at the 2017 North American Artery Conference (G. Grigoriadis) from data generated from this project.

* **Rosenberg, A.J.,** Wee, S.O., Schroeder, E., Bunsawat, K., Grigoriadis, G., Fernhall, B., Baynard, T. Effect of acute isokinetic resistance exercise on systemic arterial hemodynamics and cerebral blood flow dynamics: Is there a mismatch? [Abstract - Oral Presentation]. *Artery Research, Vol. 16, p101–102, 2016.*
* **Rosenberg, A.J.,** Wee, S.O., Schroeder, E., Bunsawat, K., Grigoriadis, G., Fernhall, B., Baynard, T. Effect of Acute Resistance Exercise on Arterial Hemodynamics and Cerebral Blood Flow Dynamics: Does Sex Matter? [Abstract - Oral Presentation]. *Artery Conference, Pisa, Italy, 2017*
* **Rosenberg, A.J.,** Schroeder, EC., Grigoriadis, G., Wee, SO., Griffith, GJ., Fernhall, B., Baynard, T. The Influence of Aging on Central Artery Stiffness and Cerebral Vascular Function Following an Acute Hypertensive Stimulus. [Abstract - Oral Presentation]. *2018 Experimental Biology, San Diego, CA.*
* **Rosenberg, A.J.,** Lane, AD., Wee, SO., White, DW., Hilgenkamp, T., Fernhall, B., Baynard, T. Healthy Aging and Carotid Performance: Strain Measures and Beta-Stiffness Index. *Hypertens Res*. 2018; Epub July 3 (PMID 29968848)

***Cerebral Blood Velocity Regulation and Cognitive Performance Following Acute Exercise***

**Multiple Sclerosis (MS) is a chronic, autoimmune disease characterized by progressive inflammation, demyelination, and destruction of central nervous system axons. Cognitive impairment is highly prevalent among this population, affecting roughly 40-70% of patients. Although current literature suggests that exercise may have profound effects on cognitive function in healthy, elderly populations, no such data exists in young or elderly persons with MS. The potential rehabilitation implications involving exercise as a mediator for improving cognitive function could result in substantial benefits for persons with MS. The central findings from our work demonstrated that the beneficial effect of acute aerobic exercise on mental processing speed and accuracy were independent of cerebral blood flow dynamics, carotid artery stiffness and carotid blood pressure in persons with MS. The acute improvements in reaction time following aerobic exercise appears to be attributed to other factors not assessed. Further investigation is required to fully elucidate the effects of aerobic exercise on cognition in MS, given there is no FDA approved treatment available for cognitive impairment in this population. In recognition of our findings, my first abstract submission of this data was selected for an oral presentation at the 2017** Experimental Biology Conference in the “Vascular-mediated mechanisms of cognition and the role of exercise” session. I have served as co-investigator and assisted in data collection and interpretation in these studies.

* **Rosenberg, A.J.,** Wee, S.O., Schroeder, E., Grigoriadis, G., Bunsawat, K., Hilgenkamp, T.I., Griffith, G., Fernhall, B., Baynard, T. The Effects of Acute Exercise on Cerebral Blood Flow and Cognition in Persons with Multiple Sclerosis [Abstract - Oral Presentation]. *FASEB J 2017 31:842.4*
* Hibner, B.A., Griffith, G.J., Schroeder, EC., **Rosenberg, A.J.,** Hilgenkamp, TI., Bollaert, R., Molt, R., Baynard, T., Fernhall, B. Impact of Aerobic Capacity, Age and Duration of Disease on Arterial Function in individuals with Multiple Sclerosis. [Abstract - Poster Presentation]. *2018 Experimental Biology, San Diego, CA.*
* Griffith, G., **Rosenberg, A.J.,** Grigoriadis, G., Bunsawat, K., Wee, S.O., Schroeder, E.C., Saed, B.M., Baynard T. Cardiometabolic Prediction Equations Overestimate Cardiorespiratory Fitness for Treadmill and Cycle Ergometry in Multiple Sclerosis Patients [Abstract - Poster Presentation]. *2018 American College of Sports Medicine (ACSM) Annual Meeting, Minneapolis, MN.*
1. **Scholastic Performance and Research Support – Graduate Courses Only**

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| --- | --- | --- | --- | --- | --- |
| **YEAR** | **SCIENCE COURSE TITLE** | **GRADE** | **YEAR** | **SCIENCE COURSE TITLE CONT.** | **GRADE** |
|  | **University of Illinois at Chicago** |  |  | **University of Illinois at Chicago Cont.** |  |
| 2010 | Biostatistics I | B | 2013 | Advanced Analysis of Variance in Educational Research | A |
| 2010 | Biomechanics of the Neuromusculoskeletal Systems | A | 2013 | Physiology I | B |
| 2010 | Evidence-Based Practice in Kinesiology and Nutrition | A | 2013 | Current Research in Kinesiology | A |
| 2011 | Nutrition - Physiological Aspects | B | 2013 | Independent Research in Kinesiology | A |
| 2011 | Neuromechanics and Motion | B | 2013 | Seminar in Cardiovascular Science | S |
| 2011 | Advance Exercise Physiology | B | 2014 | Multivariate Analysis of Data | B |
| 2011 | Principles of ECG Interpretation | A | 2014 | Current Research in Kinesiology | A |
| 2011 | Modification in Exercise Programing | B | 2014 | Physiology II | A |
| 2011 | Advance Exercise Programing & Assessment | A | 2014 | Current Research in Kinesiology | A |
| 2012 | Muscle Physiology | A | 2014 | PhD Thesis Research | S |
| 2012 | Disability & Physical Activity | A | 2015 | Current Research in Kinesiology | A |
| 2012 | Advance Cardiovascular Exercise Physiology | A | 2015 | PhD Thesis Research | S |
| 2012 | Business Principle for Fitness Professional | A | 2015 | Methods of Research in Cardiovascular Science | B |
| 2012 | Essentials of Statistical Quantitative Inquiry in Education Research | A | 2015 | Current Research in Kinesiology | A |
| 2012 | Seminar in Nutrition | S | 2015 | PhD Thesis Research | S |
| 2012 | Current Research in Kinesiology | A | 2016 | Current Research in Kinesiology | A |
| 2012 | Independent Research in Kinesiology | A | 2016 | PhD Thesis Research | S |
| 2013 | Biostatistics II | B | 2016 | Current Research in Kinesiology | A |
| 2013 | Seminar in Nutrition | S | 2016 | Responsible Conduct of and Ethical Decision Making in Research | A |
| 2013 | Current Research in Kinesiology | A | 2016 | PhD Thesis Research | S |
| 2013 | Exercise Biochemistry | B | 2017 | PhD Thesis Research | S |
| 2013 | Independent Research in Kinesiology | A | 2017 | Current Research in Kinesiology | A |

With the exception of individual research and departmental seminars, which are either S = Satisfactory or U = unsatisfactory, University of Illinois at Chicago courses are graded A-F with an A or B or C classified as a passing grade.

**Research Support**

Rickards (PI), **Rosenberg (Co-I)** 07/18 - 03/19

Applied Research Program Seed Grant, University of North Texas Health Science Center.

*“Vascular Function Following Blood Flow Restriction Exercise Training” (incorporating development of a test for assessment of cerebral vascular function)*

The aim of this project is to develop a Cerebral-Vascular Reactivity test in humans for the assessment of cerebral vascular function and compare these responses with measures of peripheral vascular function. The long term goal of the project is to identify the consequences of aging on indices of peripheral and cerebral vascular health, and provide mechanistic insight into the extent to which the myogenic, neurogenic, and shear-mediated responses contribute to the regulation of cerebrovascular function.

*Responsibilities:* leadership in project design, data acquisition, analysis and interpretation, and dissemination of research findings via publications and presentations at scientific meetings.