

# Sheldon R. Garrison, Ph.D.

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Mental Health | Rare Disease | Clinical & Nonclinical Strategy | Innovation | Entrepreneurship | Health Care Economics | Collaboration

## EDUCATION

**Postdoctoral Training**, Cell Biology, Neurobiology & Anatomy | Medical College of Wisconsin

**Doctor of Philosophy (PhD)**, Biological Sciences | University of Wisconsin – Milwaukee

*Graduate Training Program in Neuroscience; Biotechnology minor concentration*

**Bachelor of Science (BS)**, Psychology, Zoology | University of Wisconsin – Madison

## PROFESSIONAL EXPERIENCE

**Research Scientist | Rogers Behavioral Health (Oconomowoc, WI)** 2021-Present

- Development and oversight of an advanced Biobank used to improve the lives of mental and behavioral health patients
- Partnered with industry and academic organizations to launch genetic testing and pharmacogenomic strategies

**Research Scientist | Advocate Aurora Health Research Institute (Milwaukee, WI)** 2017-2021

- Led scientist – physician team in translational bioinformatics to develop 2 FDA orphan drugs and INFAGENE™
- Managed genetics device and preclinical drug development efforts across three rare disease areas
- Clinical study design, research protocol development of over 40 studies
- Actively engaged in strategic funding opportunities with external partners (for-profit and foundation) through grants
- Completion of Gener8tor's gALPHA program for the development of INFAGENE

**Director of Preclinical Studies | AviMed Pharmaceuticals (Milwaukee, WI)** 2017-2018

- Focused on planning preclinical efficacy and IND-enabling studies
- Development of rare disease / orphan drug strategy

**Director, Pediatric and Rare Diseases | Promentis Pharmaceuticals (Milwaukee, WI)** 2014-2017

- Authored and was awarded a National Institutes of Health (NIH) Phase 1 SBIR grant for the treatment of Autism
- \$26M Series C financial raise (OrbiMed, F-Prime, Aisling Capital, Blackhorse, Golden Angels)
- Led scientific projects, orphan designation and strategy for Promentis' rare disease interests
- Lead author for FDA Orphan Drug Product Designation, pre-IND Package and grants
- Oversight and project management responsibilities for ongoing relationships with industry, clinical, FDA and academic opinion leaders in key therapeutic areas

**Manager & Consultant | Postdoc Industry Consultants (PICO) (Milwaukee, WI)** 2011-2014

- Expanded client portfolio by 5-fold through integrated promotional strategy, managed consultants on 25 projects with 14 companies and carried out day-to-day operations
- Conducted market research analysis and gathered competitive intelligence surrounding pipeline compounds

**Postdoctoral Fellow | Medical College of Wisconsin (Milwaukee, WI)** 2009-2014

- Managed 7 innovative research projects culminating in 9 publications
- Primary focus in nervous system disorders, Sickle Cell disease and age-related changes

**Founder and Distributor | Sequencing Singapore (Milwaukee, WI)** 2004-2005

**Technical Software Consultant | DNASTAR, Inc. (Madison, WI)** 2002-2003

**Clinical Research Assistant | UW Center for Tobacco Research & Intervention (Madison, WI)** 2001

- Phase IV clinical studies of Zyban® and Wellbutrin® efficacy in adult smokers

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**TEACHING EXPERIENCE – ACADEMIC INSTRUCTION**

- Part-Time Instructor I Milwaukee Area Technical College (Milwaukee, WI)** 2009-Present
- Primary responsibilities include developing curriculum, testing materials, instructional materials
  - And laboratory experiences for Anatomy and Physiology (NATSCI-177, 179, 189, 201 and 202)
  - Emphasized practical application of materials in clinical and non-clinical settings
- Ad Hoc Teaching Assistant I Medical College of Wisconsin (Milwaukee, WI)** 2011-2013
- Medical Neuroscience
  - Responsible for assisting medical students in neuro-anatomy laboratory
- Lecturer I University of Wisconsin – Milwaukee** 2008-2009
- Anatomy and Physiology
  - Primary responsibilities included developing lectures and testing materials for health care-oriented students
  - Developed all testing items and provided textbook feedback
- Teaching Assistant Coordinator I University of Wisconsin – Milwaukee** 2004-2008
- Anatomy and Physiology
  - Training and management of up to 18 teaching assistants for A&P course
  - Developed testing and resource materials for TAs, led weekly meetings, performed quality assessments of TAs
- Teaching Assistant I University of Wisconsin – Milwaukee** 2003-2009
- Anatomy and Physiology
  - Led laboratory instruction for health care-oriented students, developed all testing materials and lab activities

**INTELLECTUAL PROPERTY**

1. **Garrison S.R.**, Navarrete-Opazo, AA and D Zwicke. [redacted] for the treatment of [redacted]. (2020) *United States FDA: Office of Orphan Products Development*. DRU-2019-7113. *Granted*.
2. **Garrison S.R.**, Navarrete-Opazo, AA and D Zwicke. [redacted] for the treatment of [redacted]. (2020) *United States FDA: Office of Orphan Products Development*. DRU-2019-7051. *Granted*.

**PUBLICATIONS**

\* Indicates co-first authored publication, # Corresponding author

1. **Garrison SR**, Navarrete-Opazo AA, Zwicke DL, Maley AM, Singh M and S Paulus. (2021) Comparison of Trepstinil and Phosphodiesterase Type 5 Inhibitor for the Treatment of Systemic Sclerosis: A Retrospective Study. *J of Patient-Centered Research*. 8 (4), 368.
2. Navarrete-Opazo AA, Singh M, Waite MR, Tisdale A, Cutillo CM and **SR Garrison#**. (2021) Can you hear us now? The impact of health care utilization by rare disease patients in the United States. *Genetics in Medicine*.
3. Navarrete-Opazo AA, **Garrison SR** and MR Waite. (2020) Molecular biomarkers for spinal muscular atrophy: A systematic review. *Neurology: Clinical Practice*.
4. Navarrete-Opazo AA, Singh M, Waite MR and **SR Garrison#**. (2019) Health care utilization as a proxy to introduce a novel disease screen in pediatric populations. *J of Patient-Centered Research*. 6(4), 282.
5. **Garrison SR#**, Schneider KE, Singh M and JL Pogodzinski. (2019) Preoperative physical therapy results in improved length of stay and discharge disposition following total knee arthroplasty: A retrospective study. *J of Rehab Medicine – CC*.
6. \* Schneider KE, \* **Garrison SR#**, Singh M, JL Pogodzinski. (2018) The Effects of a Preoperative Physical Therapy Visit on Patient Outcomes Following Total Knee Arthroplasty. *J of Patient-Centered Research*. 5(4), 317.
7. **Garrison SR** and Stucky CL. (*in preparation*) Sex-specific differences in touch sensation and mechanotransduction.
8. \* Zappia KJ, \* **Garrison SR**, Palygin O, Weyer AD, Barabas ME, Lawlor M, Staruschenko A and CL Stucky. (2016) Mechanosensory and ATP release deficits following Keratin14-Cre-mediated TRPA1 deletion despite absence of TRPA1 in murine keratinocytes. *PLOS ONE*.
9. Weyer AD, Zappia KJ, **Garrison SR**, O'Hara CL, Dodge AK and CL Stucky. (2016) Nociceptor sensitization depends on age and pain chronicity. *eNeuro*.
10. **Garrison SR** and CL Stucky. (2014) Contribution of the transient receptor potential ankyrin 1 to chronic arthritic pain in aged mice with complete Freund's adjuvant-induced arthritis. *Arthritis Rheumatology*. 66, 2380-90.
11. \* Zappia KJ, \* **Garrison SR**, Hillery CA and CL Stucky. (2014) Cold hypersensitivity increases with age in mice with sickle cell disease. *Pain*. \* Indicates co-first authored publication.
12. **Garrison SR**, Weyer AD, Barabas ME, Beutler BA, and CL Stucky. (2014) A gain-of-function voltage-gated sodium channel 1.8 mutation drives intense hyperexcitability of A- and C-fiber neurons. *Pain*. 155(5), 896-905.

13. Gemes G, Koopmeiners A, Rigaud M, Lirk P, Sapunar D, Bangaru ML, Vilceanu D, **Garrison SR**, Ljubkovic M, Meuller SJ, Stucky CL and Hogan QH. (2013) Failure of action potential propagation in sensory neurons: mechanisms and loss of afferent filtering in C-type units after painful nerve injury. *J Phys.* 591, 1111-31.
14. **Garrison SR**, Kramer AA, Gerges NZ, Hillery CA and Stucky CL. (2012) Sickie cell mice exhibit mechanical allodynia and enhanced responsiveness in light touch cutaneous mechanoreceptors. *Mol Pain.* ePub.
15. **Garrison SR** and Stucky CL. (2012) TRPC1 contributes to light-touch sensation and mechanical responses in low-threshold cutaneous sensory neurons. *J of Neurophys.* 107, 913-22.
16. **Garrison SR** and Stucky CL. (2011) The Dynamic TRPA1 channel: A suitable pharmacological target? *Current Pharm Biotech.* 12, 1689-97.
17. **Garrison S#** and Witten JL. (2010) Steroid hormone regulation of the voltage-gated, calcium-activated potassium channel expression in developing muscular and neural systems. *Dev. Neurobio.* 70, 884-96.

## AWARDS

2021	Advocate Aurora Health – 2 <sup>nd</sup> Place Poster Presentation
2020	Advocate Aurora Health – 1 <sup>st</sup> Place Poster Presentation
2019	Global Genes Rare Disease Patient Summit Award
2019	Global Genes Rare Disease Drug Symposium – Top Presentation
2016	SBIR Award – Wisconsin Technology Council
2013	Howard Hughes Medical Institute Travel Award – Janelia Farms
2012	MCW Postdoctoral Travel Award
2010-2012	Diversity Research Supplement, 2010. National Institute of Neurological Disorders and Stroke
2007-2008	University of Wisconsin-Milwaukee Graduate Student Travel Award
2007-2008	Ruth Walker Travel Award
2007	UWM Graduate Student of the Month Award
2004-2009	University of Wisconsin-Milwaukee Chancellor’s Award
2004-2007	Advanced Opportunity Fellowship

## ORGANIZATIONAL ACTIVITIES

<b>Research &amp; Policy Advisor:</b> Rare Disease Advisory Council for State of WI	2020 –
<b>Scientific Advisory Committee:</b> Aurora Biorepository	2020 –
<b>Scientific Advisory Board Member:</b> Phelan-McDermid Syndrome Foundation	2019 –
<b>Scientific Advisory Board Member:</b> BCD9	2019 –
<b>Editorial Board Member:</b> Technology Transfer and Entrepreneurship	2018 –
<b>Wisconsin State Leader:</b> National Organization for Rare Disorders (NORD)	2014 – 2019
<b>Institutional Review Board Member:</b> Medical College of Wisconsin	2013 – 2014

## PROFFESIONAL MEMBERSHIPS

<b>Member:</b> Scleroderma Foundation	2019 –
<b>Member:</b> Phelan-McDermid Syndrome Foundation	2016 –
<b>Member:</b> Foundation for Body-Focused Repetitive Behaviors	2015 –
<b>Member:</b> National Organization for Rare Disorders (NORD)	2013 –
<b>Member:</b> Society for Neuroscience (SfN)	2004 –

## INVITED PRESENTATIONS

1. “The cost of misdiagnosis in rare disease.” WI Rare Disease Day (2021).
2. “A targeted genetic disease screen for pediatric populations: Survey and health care utilization.” 2019 Global Genes Rare Patient Advocacy Summit (2019).
3. “Unanticipated Aspects of Aging: Living with Dementia.” Five Star Senior Living – Meadowmere (2019).
4. “Spotlight on successful training of Graduate Students and Postdocs for careers in the Biotechnology and Pharmaceutical Industry.” Medical College of Wisconsin, Spotlight on Science (2019).
5. “Rare Disease Day.” WKNO 8 O’clock Morning Blend (2019).
6. “Newborn and genetic screening.” Wisconsin Rare Disease Day (2019).
7. “Alternative careers – STEM.” University of Wisconsin – Milwaukee (2019).
8. “Developing orphan drugs in small pharma and start-ups.” Postdoc Industry Consultants (2018).
9. “Regulatory Bootcamp – Orphan Drug Panel Discussion.” Healthcare Innovation Pitch (2017).

10. "Making the switch: A perspective on transitioning to industry." Medical College of Wisconsin, Spotlight on Science (2016).
11. "Don't lose me at hello: Professional communication for the junior scientist." Medical College of Wisconsin, Spotlight on Science (2014).
12. "Developing and maintaining professional relationships." Postdoc Industry Consultants (2014).
13. "The young, the old and the inflamed: TRPA1 mediates arthritic pain." Marquette University Clinical and Translational Research seminar (2013).
14. "Regulation of *Manduca sexta* *slowpoke* transcript levels in the flight muscle system." St. Jude Graduate Research Symposium (2008).

## ORAL PRESENTATIONS

1. "Decreased digit loss in systemic sclerosis with treprostinil treatment: A retrospective study." (2021) Global Genes Rare Drug Development Symposium.
2. "Comparison of Treprostinil and Phosphodiesterase Type 5 Inhibitor for the Treatment of Systemic Sclerosis: A Retrospective Study." (2021) 47<sup>th</sup> Annual Scientific Day.
3. SR Garrison, AA Navarrete-Opazo, M Singh. (2020) Can you hear us now? The massive impact of rare disease. 2020 Global Genes Rare Drug Development Symposium.
4. SR Garrison, AA Navarrete-Opazo, M Singh. (2020) Can you hear us now? The economic impact of rare disease in the U.S. 46<sup>th</sup> Annual Scientific Day.
5. "Development of a pre-symptomatic genetic screen in pediatric populations" (2019) 2019 Global Genes Rare Drug Development Symposium.
6. "Healthcare Utilization as a Proxy to Introduce a Novel Disease Screen in Pediatric Populations" (2019) 45<sup>th</sup> Annual Scientific Day.
7. "A gain-of-function  $Na_v1.8$  mutation drives intense firing in A and C fiber neurons." (2013) Howard Hughes Medical Institute, Janelia Farms – Mammalian Circuits Underlying Touch Sensation.
8. "Extreme hyperexcitability in sensory neurons following a sodium channel  $Na_v1.8$  hypermorphic mutation." (2013) 42<sup>nd</sup> Annual Meeting for the Society for Neuroscience.
9. "The young, the old and the inflamed: Arthritic pain is TRPA1 mediated." (2012) 41<sup>st</sup> Annual Meeting for the Society for Neuroscience.
10. "TRPC1 Contributes To Mechanical Sensitivity in Mouse Light-Touch A-Fiber Cutaneous Primary Afferents." (2011) 40<sup>th</sup> Annual Meeting for the Society for Neuroscience.
11. "Sex-specific responses to thermal and mechanical stimuli in mouse cutaneous sensory neurons." (2011) Society for Neuroscience Chapter Meeting.
12. "Sex-specific responses to mechanical and heat stimuli in mouse cutaneous sensory neurons." (2010) 39<sup>th</sup> Annual Meeting for the Society for Neuroscience.
13. "Sex-specific responses to thermal and mechanical stimuli in mouse cutaneous sensory neurons." (2010) Medical College of Wisconsin Poster Day.
14. "Differential Regulation of the Large-Conductance Calcium-Activated Potassium Ion Channel In the Flight Muscle and CNS By the Steroid Hormone Ecdysone." (2009) 26<sup>th</sup> Midwest Neurobiology Meeting.
15. "Downregulation of *slowpoke* Transcript Levels in Flight Muscle by the Steroid Hormone Ecdysone and Receptor Complex Specificity." (2008) 38<sup>th</sup> Annual Meeting for the Society for Neuroscience.
16. "Steroid Hormone regulation of *slowpoke* Transcript Levels In A Model Flight Muscle System." (2008) Biological Sciences Symposium.
17. "Flight: Steroid Hormone Control of Gene Expression in Developing Neural and Muscular Systems." (2008) Biological Sciences Colloquium.
18. "Regulation of *Manduca sexta* *Slowpoke* Transcript Levels in the Dorsal Longitudinal Flight Muscle System." (2007) 37<sup>th</sup> Annual Meeting for the Society for Neuroscience.
19. "Steroid Hormone Regulation of Voltage-Gated Calcium-Activated Potassium Ion Channel Transcription in *Manduca sexta* Flight Muscle." (2006) Neurophysiology Group at UWM (2006).

## ABSTRACTS

1. Garrison SR, Navarrete-Opazo AA, Zwicke DL, Maley AM, Singh M and S Paulus. (2021) Decreased digit loss in systemic sclerosis with treprostinil treatment: A retrospective study. Global Genes Rare Drug Development Symposium.
2. Garrison SR, Navarrete-Opazo AA, Zwicke DL, Maley AM, Singh M and S Paulus. (2021) Comparison of Treprostinil and Phosphodiesterase Type 5 Inhibitor for the Treatment of Systemic Sclerosis: A Retrospective Study. 47<sup>th</sup> Annual Scientific Day.
3. SR Garrison, AA Navarrete-Opazo, M Singh. (2020) Can you hear us now? The massive impact of rare disease. Global Genes Rare Drug Development Symposium.

4. SR Garrison, AA Navarrete-Opazo, M Singh. (2020) Can you hear us now? The economic impact of rare disease in the U.S. 46<sup>th</sup> Annual Scientific Day.
5. AA Navarrete-Opazo, M Singh, ME Waite, SR Garrison. (2019) A targeted genetic disease screen for pediatric populations: Survey and health care utilization. 2019 Global Genes Rare Patient Advocacy Summit.
6. AA Navarrete-Opazo, M Singh, ME Waite, SR Garrison. (2019) Development of a pre-symptomatic genetic screen in pediatric populations. 2019 Global Genes Rare Drug Development Symposium.
7. AA Navarrete-Opazo, M Singh, ME Waite, S Garrison. (2019) Healthcare utilization as a proxy to introduce a novel disease screen in pediatric populations. 45<sup>th</sup> Annual Scientific Day.
8. KE Schneider, SR Garrison, M Singh, J Pogodzinski. (2019) Preoperative Physical Therapy Following Total Knee Arthroplasty Results In Improved Patient Outcomes and Decreased Cost Burden in a Major Health Care System. American Physical Therapy Association Combined Sections Meeting 2019. *J Orthop Sports Phys Ther.* 49, (1), 1-CSM208.
9. KE Schneider, SR Garrison, M Singh, J Pogodzinski. (2018) The Effects of a Preoperative Physical Therapy Visit on Patient Outcomes Following Total Knee Arthroplasty. 44<sup>th</sup> Aurora Scientific Day.
10. SR Garrison, AJ Weyer, ME Barabas, B Beutler, CL Stucky. (2013) A gain-of-function Na<sub>v</sub>1.8 mutation drives intense firing in A and C fiber neurons. Howard Hughes Medical Institute (HHMI), Janelia Farms – Mammalian Circuits Underlying Touch.
11. SR Garrison and CL Stucky. (2013) Epithelial cells are central to touch sensation. Howard Hughes Medical Institute, Janelia Farms – Mammalian Circuits Underlying Touch Sensation.
12. SR Garrison, AJ Weyer, ME Barabas, B Beutler, CL Stucky. (2013) Extreme hyperexcitability in sensory neurons following a sodium channel Na<sub>v</sub>1.8 hypermorphic mutation. Society of Neuroscience 42nd Annual Meeting. Program number 463.15.
13. SR Garrison and CL Stucky. (2012) The young, the old and the inflamed: TRPA1 mediates persistent inflammatory mechanical hyperalgesia in an age-dependent manner. Society of Neuroscience 41st Annual Meeting. Program number 584.7.
14. SR Garrison and CL Stucky. (2011) TRPC1 Acts As a Mechanical Amplifier In A-type Cutaneous Primary Afferent Fibers. Society of Neuroscience 40th Annual Meeting. Program number 274.23.
15. SR Garrison and CL Stucky. (2010) Sex-specific responses to mechanical and heat stimuli in mouse cutaneous sensory neurons. Society of Neuroscience 39th Annual Meeting.
16. SR Garrison and CL Stucky. (2011) Sex-specific responses to thermal and mechanical stimuli in mouse cutaneous sensory neurons. Medical College of Wisconsin Poster Day.
17. SR Garrison and JL Witten. (2009) Differential Regulation of the Large-Conductance Calcium-Activated Potassium Ion Channel In the Flight Muscle and CNS By the Steroid Hormone Ecdysone. 26th Midwest Neurobiology Meeting.
18. SR Garrison and JL Witten. (2008) Downregulation of *slowpoke* Transcript Levels in Flight Muscle by the Steroid Hormone Ecdysone and Receptor Complex Specificity. Society of Neuroscience 38th Annual Meeting. Program number 430.3.
19. SR Garrison and JL Witten. (2007) Developmental Changes in the Calcium-Activated, Voltage-Gated Potassium Gene Transcript Levels in the Tobacco Hornworm *Manduca sexta* Are Mediated By Steroid Hormones. Society of Neuroscience 37th Annual Meeting. Program number 245.13
20. SR Garrison and JL Witten. (2005) Steroid Hormone Regulation of Calcium-Activated Potassium Channel Gene Transcription in the Tobacco Hawkmoth, *Manduca sexta*. Society for Neuroscience 35th Annual Meeting. Program number 405.17

## MENTORING

- Maharshi Rawal – Advocate Aurora Health, Graduate Student
- Morgan Harlan – Advocate Aurora Health, Undergraduate Intern
- Emily Schmitt – Promentis Pharmaceuticals, Inc., Undergraduate Intern
- Matthew Tabakin, MD – Promentis Pharmaceuticals, Inc., Undergraduate Intern
- Rebecca Nussbaum – Promentis Pharmaceuticals, Inc., Undergraduate Intern
- Amanda Ambroso – Promentis Pharmaceuticals, Inc., Undergraduate Intern
- Victoria Muller Ewald, PhD – Medical College of Wisconsin, Undergraduate Intern
- Undergraduate Mentoring Program (Academic) – University of Wisconsin - Milwaukee

## PRIVATE EQUITY INVESTMENT

Series: C - \$26M

Source: OrbiMed, F-Prime Capital Partners (formerly Fidelity Biosciences), Aisling Capital, Black Pearl GmbH, Milwaukee Golden Angels, private investors

Role: Director

## GRANTS

### PREVIOUS

Title: Development of a Rare Disease Screening Tool.  
Source: David V. Uihlein Foundation  
Role: Principal Investigator  
Dates: 03/01/2021 – 02/01/2022

Title: Preclinical development of a novel treatment for the rare condition.  
Source: ARI Specialty Research Seed Program; Advocate Aurora Research Institute / Advocate Aurora Health  
Role: Principal Investigator  
Dates: 08/01/2020 – 1/31/2021

Title: Development of an Expanded Rare Disease Screening Tool.  
Source: Ed Howe Center for Health Care Transformation Seed Grant Program; Advocate Aurora Research Institute / Advocate Aurora Health  
Role: Principal Investigator  
Dates: 06/01/2019 – 11/30/2019

Title: Thiol repletion therapy for Parkinson's disease.  
Source: 5I01BX003249-02 NIH/VA  
Role: Subawardee, Site Project Manager  
Dates: 10/2016 – 09/2020

Title: Targeting System  $x_c^-$  for the Treatment of Autism Spectrum Disorders subpopulations, Fragile X syndrome and Phelan-McDermid syndrome.  
Source: 1 R43 HD 084038 01 A1 (Beyer); NIH/NICHD  
Role: Project Manager  
Dates: 09/23/2015 – 01/13/2017

Title: Nociceptive Mechanisms That Underlying Sickle Cell Pain  
Source: R01NS070711; Research Supplement to Promote Diversity; NIH/NINDS  
Role: Postdoctoral Fellow  
Dates: 05/2006 – 08/2009

Title: Downregulation of slowpoke transcript levels in flight muscle by the steroid hormone  
Source: Ruth Walker Grants-In-Aid Award; University of Wisconsin - Milwaukee  
Role: Graduate Student  
Dates: 04/01/2010 – 08/31/12