

MARIE MORTREUX, PHD

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Nationality: French
EB1A Green Card Holder

18 Podgurski Street
West Warwick, RI 02893

Current employer: Harvard Medical School

EDUCATION

- 2012-2016** **Doctor of Philosophy**, Université Paris Diderot, Sorbonne BioSPC, France
Major: neurophysiopathology, cellular biology
Dissertation: Role of the olfactory-bulbar Prokineticin-2 in the control of food intake and energy homeostasis [in French] – Summa Cum Laude
Advisors: Pr. Christophe Magnan and Dr. Stéphanie Migrenne-Li
- 2015** **Animal Experimentation Diploma**, Université Pierre et Marie Curie, France
Diploma to obtain the ability to conduct and lead research using animal models. Animal experimentation, ethics, well-being, level 1 (designer of scientific projects)
- 2010-2012** **European Master of Science**, Université Paris Diderot, France
Majors: Genetics and Neurosciences
Minors: Developmental biology, biostatistics – *Graduated with honors*
- 2009-2012** **European Magister of Science**, Université Paris Diderot, France
Majors: Neurosciences, Physiopathology – *Graduated with honors*
Full credit courses in Europe (Universitat de Barcelona, Spain, Università Degli Studi di Trieste, Italy and La Sapienza Università di Roma, Italy)
- 2008-2009** **Bachelor of Science**, Université Paris Diderot, France
Majors: Genetics, Technology and Life Sciences – *Graduated with honors*
- 2006-2008** **Medical School**, Université Paris Diderot, France
First Cycle of Medical Studies (PCEM1), Bichat-Lariboisière

RESEARCH EXPERIENCE

2022-Present **Assistant Professor**, *Nutrition and Food Sciences, University of Rhode Island, RI*

- Investigate musculoskeletal alterations in response to gravity shifts lower than 1g
- Develop new ground-based analogs to accurately mimic astronauts' trips to the moon, Mars, and aboard the Gateway station

Investigate musculoskeletal adaptations during reloading

2019-2022 **Instructor in Neurology**, *Harvard Medical School, Beth Israel Deaconess Medical Center, Boston, MA*

- Investigate musculoskeletal alterations in response to gravity shifts lower than 1g
- Develop new ground-based analogs to accurately mimic astronauts' trips to the moon, Mars, and aboard the Gateway station
- Investigate musculoskeletal adaptations during reloading injury and recovery
- Manage and perform all *in vivo* and *ex vivo* experiments
- Oversee the work and performance of several research assistants, undergraduate and graduate research intern and postdoctoral fellows
- Write grant proposals (NASA and NIH), progress reports and manuscripts
- Participated in research projects from the Rutkove laboratory using mice models
- Notable achievements
 - Co-Investigator on a NASA-funded study (PI: Michael Delp, PhD, Florida State University), using ground-based models of microgravity and partial gravity
 - Co-Investigator on a NASA-funded clinical study (PI: Seward Rutkove, MD, Harvard Medical School) using head-down bed rest to simulate microgravity in healthy participants and assess the benefits of nutraceutical countermeasures and the use of neuromuscular electrical stimulation
 - Staff Scientist on a NASA-funded study (PI: Seward Rutkove, MD, Harvard Medical School) using the rat partial weight-bearing model to investigate gravity as a continuum
 - Active member the ALSDA AWG (Animal Life Science Data Archive Analysis Working Group) from NASA which is composed of over 100 members dedicated to open-science for animal experiments (both ground-based and space-flown)
 - Initiated successful collaboration with other research teams
 - Managed the entire team responsible for rats experiments as well as lab reagents, supplies and orders
 - Publication of 15 manuscripts (5 as first author, 3 as senior author)
 - Received awards at professional conferences and the CRITTER award from the IACUC

2016-2019 **Postdoctoral Research Fellow**, *Harvard Medical School, Beth Israel Deaconess Medical Center, Boston, MA. PI: Seward Rutkove, MD*

- Created the first rat ground-based analog model of partial gravity
- Established the longitudinal time course of musculoskeletal impairments in response to decrease mechanical loading
- Designed new engineering devices including new arrays to perform Electrical Impedance Myography *in vivo*
- Assessed the benefits of *trans*-resveratrol supplementation to improve muscle function and prevent deconditioning in partial gravity environments
- Performed all *in vivo* work including electrophysiology, muscle testing, bone testing, and all *ex vivo* experiments
- Notable achievements
 - Publication of 3 articles (3 as first author)
 - Gathered international attention from one peer-reviewed publication that led to numerous interviews in the media (radio, press, magazines), Altmetric high score of 702
 - Drafted and applied to numerous NASA-funded grants

- Secured funding from NASA to develop a new study assessing stress and blood flow (approx. \$137,000)
- Awarded best poster presentation (2nd place) at the NASA HRP IWS meeting
- Funded the BIDMC postdoctoral association

2012-2016 **PhD Fellow, Université Paris Diderot, France. PIs: Christophe Magnan, PhD and Stéphanie Migrenne-Li, PhD**

- Using genetic tools developed during my graduate internship, I performed stereotaxic surgeries in both the olfactory bulb and hypothalamus of mice
- Performed survival surgeries in rodents (osmotic pumps, brain cannulas, sleeve gastrectomy, gastric by-pass)
- Developed and managed several models of obesity and type 2 diabetes (including *ob/ob* mice, diet-induced obesity cohorts, *fa/fa* rats)
- Developed behavioral assays targeting feeding preferences, stress, and conditioning
- Extensively used CLAMS (Comprehensive Lab Animal Monitoring System) to quantify respiratory quotients, activity and feeding patterns
- Mentored undergraduate and graduate students
- Attended several international and national conferences
- Established collaboration with other teams
- Notable achievements
 - Publication of 2 articles (including 1 first-author article)
 - Collaborated with a team in Paris, France (PI: Nathalie Janel, PhD)
 - Performed stereotaxic surgery in specific genetic mice models in Toulouse, France (PI: Rémy Burcelin, PhD)
 - Collaborated with an endocrinologist (Fabrizio Andreelli, MD) to use Prok-2 as a biomarker for Metabolic Syndrome in cohorts of patients who had received gastric by-pass surgery
 - Received the Young Research Award for my work during my PhD
 - Obtained a grant (PI: Marie Mortreux) providing 6 months of salary
 - Defended my PhD and obtained my doctorate *Summa Cum Laude*

2012 **Graduate Research Intern, Université Paris Diderot, France. PI: Stéphanie Migrenne-Li, PhD (6 months)**

- Performed *in vitro* validation of several shRNAs targeting Prok-2 in both rats and mice
- Maintained mice colonies and established diet-induced obesity in mice using high-fat diets
- Performed stereotaxic surgeries in the olfactory bulb of mice using recombinant protein and lentiviral vectors
- Performed metabolic tests both *in vivo* (glucose tolerance tests, insulin tolerance test, body composition scanning) and *ex vivo* (ELISA, WB, RTqPCR, activity assays)
- Notable achievements
 - Manage animal colonies and diets
 - Received a PhD scholarship from the Ile-de-France region (3 year funding)

2011 **Junior Specialist**, *University of California San Francisco, CA, USA. PIs: Ralph Marcucio, PhD and Céline Colnot, PhD (5 months)*

- Performed survival surgeries in wild type and Dmd^{mdx} mice, including muscle trauma, unstabilized fractures and stabilized fractures to study regeneration
- Performed X-ray imaging of the animals, and all animal handling
- Processed hindlimbs for paraffin embedding, microtome slicing and histological analysis
- Quantified inflammatory cells infiltration using stereological microscopy
- Acted as a liaison between the 2 PIs, one having relocated to Paris, France
- Proposed new studies addressing compartment syndrome and muscular disorders for funding by the NIH
- Notable achievements
 - Co-authored 1 publication
 - Mentored one undergraduate student from Yale University
 - Design new experiments to address muscle regeneration in our model

2010 **Research Intern**, *Università Degli Studi di Padova, Italy. PIs: Francesco Argenton, PhD and Enrico Moro, PhD (3 months)*

- Performed cell culture experiments to amplify, select, and purify specific genetic constructs to establish 2 fluorescent reporters for Sonic Hedgehog (Shh)
- Performed injections of genetic constructs into fertilized zebrafish embryos
- Performed phenotypical screening using molecular biology techniques and *in vivo* confocal microscopy
- Notable achievements
 - Purified genetic constructs
 - Established 2 stable transgenic lines of Shh-reporters in the zebrafish

PUBLICATIONS

A complete list of my bibliography is available on NCBI:

<https://www.ncbi.nlm.nih.gov/myncbi/marie.mortreux.1/bibliography/public/>

Journal Publications

- 1- Swain P, **Mortreux M**, Laws JM, Kyriacou H, De Martino E, Winnard A, Caplan N. “Skeletal muscle deconditioning during partial weight-bearing in rodents – systematic review and meta-analysis”. *Life Sciences in Space Research, In Press*
- 2- **Mortreux M**, Nagy JA, Zhong H, Sung DM, Concepcion HA, Leitner M, Dalle Pазze L, Rutkove SB. “Performing *in vivo* and *ex vivo* electrical impedance myography in rodents”. *J Vis Exp* – June 2022. doi:10.3791/63513

- 3- **Mortreux M**, Rosa-Caldwell ME, Stiehl ID, Sung DM, Thomas NT, Fry CS & Rutkove SB. “Hindlimb suspension in Wistar rats: sex-based differences in muscle response”. *Physiological Reports*, 2021 Oct;9(19):e15042. doi:10.14814/phy2.15042.
- 4- Rosa-Caldwell ME, **Mortreux M**, Sung DM, Bouxsein ML, Kaiser U, Dunlap K, Greene NP, Rutkove SB. “The estrus cycle and skeletal muscle atrophy: investigations in rodent models of muscle loss”. *Exp Physiol* 2021 Sep 26. doi:10.1113/EP089962.
- 5- Swain P, **Mortreux M**, Rosa-Caldwell ME, Winnard A. “Rodent Partial Weight-Bearing Model: Risk of Bias Checklist”. *Research Gate* Sep 2021. doi:10.13140/RG.2.2.32990.77126/1.
- 6- Pandeya SR, Nagy JA, Riveros D, Semple C, Taylor RS, **Mortreux M**, Sanchez B, Kapur K, Rutkove SB. “Estimating myofiber cross-sectional area and connective tissue deposition with electrical impedance myography: a study in D2-mdx mice”. *Muscle Nerve* 2021 Jun;63(6):941-950. doi:10.1002/mus.27240.
- 7- Willey JS, Britten RA, Blaber E, Tahimic CGT, Chancellor J, **Mortreux M**, Sanford LD, Kubik AJ, Delp MD, Mao XW. “The individual and combined effects of spaceflight radiation and microgravity on biological systems and functional outcomes”. *J Environ Sci Health C Toxicol Carcinog* 2021;39(2):129-179. doi:10.1080/26896583.2021.1885283.
- 8- Malkani S, Chin CR, Cekanaviciute E, **Mortreux M**, Okinula H, Tarbier N, Schreurs AAS, Shorazi-Fard Y, Tahimic CGT, Rodriguew DR, Sexton BS, Butler D, Verma A, Bezdán D, Durmaz C, MacKay M, Malnick A, Meydan C, Li S, Garrett-Bakelman F, Fromm B, Afshinnkoo E, Langhorst BW, Dimalanta ET, Cheng-Campbell M, Blaber E, Schisler JC, Venderburg C, Friedlander MR, McDonald JT, Costes SV, Rutkove S, Grabham P, Mason CR, Beheshti A. “Circulating miRNA Spaceflight Signature Reveals Targets for Countermeasure Development”. *Cell Reports* 2020 Nov 21;108448 doi:10.1016/j.celrep.2020.108448.
- 9- Pandeya S, Nagy JA, Riveros D, Semple C, Taylor R, **Mortreux M**, Sanchez B, Kapur K, Rutkove SB. “Predicting myofiber cross-sectional area and triglyceride content with electrical impedance myography: a study in db/db mice”. *Muscle Nerve* 2020 doi:10.1002/mus.27095.
- 10- **Mortreux M** and Rosa-Caldwell ME. “Approaching gravity as a continuum using the rat partial weight-bearing model”. *Life* 2020 10(10), 235 <https://doi.org/10.3390/life10100235>.
- 11- Semple C, Riveros D, Sung D-S, Nagy JA, Rutkove SB, **Mortreux M**. “Using electrical impedance myography as a biomarker of muscle deconditioning in rats exposed to micro- and partial- gravity analogs”. *Frontiers in Physiology* 2020 doi: 10.3389/fphys.2020.557796.
- 12- McIlduff CE, Martucci MG, Shin C, Qi K, Pacheck AK, Gutierrez H, **Mortreux M**, Rutkove SB. “Quantitative ultrasound of the tongue: echo intensity is a potential biomarker of bulbar dysfunction in amyotrophic lateral sclerosis” *Clinical Neurophysiology* 2020 Jul 17;131(10):2423-2428.

- 13- Ko FC, **Mortreux M**, Riveros D, Nagy JA, Rutkove SB, Bouxsein MB. “Dose-dependent skeletal deficits due to varied reductions in mechanical loading in rats” *Npj Microgravity* 2020 May 18;6:15.
- 14- Semple C, Riveros D, Nagy JA, Rutkove SB, **Mortreux M**. “Partial Weight-Bearing in Female Rats: Proof of Concept in a Martian-Gravity Analog” *Frontiers in Physiology* 2020 Apr 3;11:302.
- 15- **Mortreux M**, Riveros D, Semple C, Bouxsein ML, Rutkove SB. “The partial weight-bearing rat model using a pelvic harness does not impact stress or hindlimb blood flow” *Acta Astronautica* 2020 (168):249-255.
- 16- **Mortreux M**, Foppen E, Denis RG, Montaner M, Kassis N, Denom J, Vincent M, Fumeron F, Kujawski-Lafourcade M, Andreelli F, Balkau B, Marre M, Roussel R, Magnan C, Gurden H, Migrenne-Li S. “New roles for Prokineticin-2 in feeding behavior, insulin resistance and type 2 diabetes: studies in mice and humans” *Molecular Metabolism* 2019 Nov (29):182-196.
- 17- **Mortreux M**, Semple C, Riveros D, Nagy JA, Rutkove SB. “Electrical impedance myography for the detection of muscle inflammation induced by λ -carrageenan”. *PLoS One* 2019 Oct 1;14(10):e0223265.
- 18- **Mortreux M**, Ko FC, Riveros D, Bouxsein ML, Rutkove SB. “Longitudinal time course of muscle impairments during partial weight-bearing in rats” *Npj Microgravity* 2019 Aug 22;5:20.
- 19- **Mortreux M**, Riveros D, Bouxsein ML, Rutkove SB. “A moderate daily dose of resveratrol mitigates muscle deconditioning in a Martian gravity analog” *Frontiers in Physiology* 2019 Jul 18;10:899.
- 20- **Mortreux M**, Riveros D, Bouxsein ML, Rutkove SB. “Mimicking a space mission to Mars using hindlimb unloading and partial weight-bearing” *Journal of Visualized Experiments* 2019 Apr 4;(146):59327.
- 21- **Mortreux M**, Nagy JA, Ko FC, Bouxsein ML, Rutkove SB. “A novel partial gravity ground-based analog for rats via quadrupedal unloading” *Journal of Applied Physiology* 2018 Jul 1;125(1):175-182.
- 22- Renon M, Legrand B, Blanc E, Daubigny F, Bokobza C, **Mortreux M**, Paul JL, Delabar JM, Rouach H, Andreau K, Janel N. “Impact of Dyrk1A level on alcohol metabolism”. *Biochimica Biophysica Acta* 2016 Sep;1862(9):1495-503.
- 23- Abou-Khalil R, Yang F, **Mortreux M**, Lieu S, Yu YY, Wurmser M, Pereira C, Relaix F, Micalau T, Marcucio RS, Colnot C. “Delayed bone regeneration is linked to chronic inflammation in murine muscular dystrophy”. *Journal of Bone and Mineral Research* 2014 Feb;29(2):304-15.

Submitted Manuscripts

- 1- Swain P, **Mortreux M**, Laws JM, Kyriacou H, De Martino E, Winnard A, Caplan N. “Bone deconditioning during partial weight-bearing in rodents – a systematic review and meta-analysis”. (Life Sciences in Space Research, under review)

Manuscripts in Preparation

- 1- Rosa-Caldwell ME, **Mortreux M**, Sung DM, Stiehl ID, Bouxsein ML, Rutkove SB. “Comparing sex differences in skeletal alterations following a bout of disuse”.
- 2- **Mortreux M**, Rosa-Caldwell ME, Sung DM, Stiehl ID, Rutkove SB. “Early adaptation to increased mechanical loading after disuse: muscular response in male and female rats”.
- 3- Issertine M, Rosa-Caldwell ME, Sung DM, Bouxsein ML, Rutkove SB, **Mortreux M**. “Adaptation to full weight-bearing following disuse: the impact of biological sex on musculoskeletal health.

PRESENTATIONS AND INVITED LECTURES

Invited Lectures

- 2022** Student Chapter of the European Low Gravity Research Association (SELGRA) Webinar
“What can we really expect from hypogravity environments? Will sex matter for musculoskeletal health on the Moon and Mars?”
- 2021** Northeastern American College of Sports Medicine Regional Conference
“Spaceflight and Musculoskeletal health: Progressing Beyond Low Earth Orbit to the Moon, Mars and Beyond”
- 2020-2021** Career Workshop Series - University of Central Lancashire
“Pursuing a career in academia”
- 2020** Career Development Workshop – Beth Israel Deaconess Medical Center
“How to get involved in space research as a PhD or MD”
- 2019** Radio Canada – Les années lumières
“Using resveratrol to preserve muscles during a Mars mission”
- 2015** Young Researcher Symposium of BFA Unit, Paris France
Award of the best presentation

Oral Presentations

- 1- **2021:** *Using electrical impedance myography as a biomarker of muscle deconditioning in rats exposed to micro- and partial- gravity analogs.* Semple C, Riveros D, Sung D-M, Nagy JA, Rutkove SB & **Mortreux M**. NASA Human Research Program Investigators Workshop (HRP IWS) (Virtual)

- 2- **2021:** *Sex-based differences in muscle response in rats exposed to micro- and partial- gravity analogs.* **Mortreux M**, Rosa-Caldwell ME, Semple C, Riveros D, Sung DM, Stiehl ID, Nagy JA, Rutkove SB. International Academy of Astronautics (IAA) (virtual).
- 3- **2021:** *Early adaptation to increased mechanical loading after disuse: muscular response in male and female rats.* **Mortreux M**, Rosa-Caldwell ME, Sung DM, Stiehl ID, Rutkove SB. American Society for Gravitational and Space Research (ASGSR) Annual Meeting, Baltimore, MD.
- 4- **2021:** *Low testosterone status differentially affects musculoskeletal outcomes after exposure to micro or partial gravity.* Rosa-Caldwell ME, Mortreux M, Sung DM, Schreurs AS, Bouxsein ML, Rutkove SB. ASGSR Annual Meeting, Baltimore, MD.
- 5- **2020:** *Partial weight-bearing in female rats: validation in a Martian-gravity analog.* Semple C, Riveros D, Nagy JA, Rutkove SB & **Mortreux M**. ASGSR Annual Meeting (Virtual).
- 6- **2020:** *Circulating miRNA signature predicts and rescues health risks associated with spaceflight.* (**Mortreux M** among authors, presented by A. Beheshti). ASGSR Annual Meeting (Virtual).
- 7- **2019:** *Dose-dependent skeletal deficits in rats by varied reductions in mechanical loading.* Ko FC, **Mortreux M**, Riveros D, Nagy JA, Rutkove SB, and Bouxsein ML. Orthopaedic Research Society (ORS) Annual Meeting, Austin, TX
- 8- **2019:** *A moderate daily dose of resveratrol mitigates muscle deconditioning in a Martian gravity analogue.* **Mortreux M**, Riveros D, Bouxsein ML, and Rutkove SB. ASGSR Annual Meeting, Denver, CO
- 9- **2018:** *A novel rat partial gravity analogue for longitudinal investigations: musculoskeletal alterations.* **Mortreux M**, Ko FC, Riveros D, Bouxsein ML, Rutkove SB. ASGSR Annual Meeting, Bethesda, MD
- 10- **2015:** *Olfactory-bulbar Prokineticin-2 is involved in the regulation of food intake and proceeds through a GLP-1 dependent mechanism.* **Mortreux M**, Kassis N, Burcelin R, Drucker DJ, Magnan C, Migrenne-Li S. European Association for the Study of Diabetes (EASD) Incretin Study Group, Copenhagen, Denmark
- 11- **2015:** *La Prokinéticine-2 olfacto-bulbaire est impliquée dans la régulation de la prise alimentaire via un mécanisme GLP-1R dépendant [French] (The olfactory-bulbar Prokineticin-2 is involved in the regulation of food intake through a GLP-1R dependent mechanism).* **Mortreux M**, Kassis N, Burcelin R, Drucker DJ, Magnan C, Migrenne-Li S. Société Francophone du Diabète (SFD) Annual Meeting, Bordeaux, France
- 12- **2014:** *La Prokinéticine-2 olfacto-bulbaire est impliquée dans la régulation de la prise alimentaire et de l'homéostasie glucidique [French] (The olfactory-bulbar Prokineticin-2 is involved in the regulation of food intake and glucose homeostasis).* **Mortreux M**, Kassis N, Magnan C, Migrenne-Li S. Journées Francophones de la Nutrition (JFN) Annual Meeting, Brussels, Belgium
- 13- **2014:** *Olfactory-bulbar Prokineticin-2 is involved in food intake and energy homeostasis.* - **Mortreux M**, Kassis N, Magnan C, Migrenne-Li S. Society for Neuroscience (SfN) Annual Meeting, Washington D.C.

Poster Presentations

- 1- **2022:** *Sex hormones are not solely responsible for musculoskeletal loss, sex differences during disuse.* Rosa-Caldwell ME, **Mortreux M**, Sung DM, Schreurs AS, Bouxsein ML, Kaiser UB, Rutkove SB. ACSM Annual Meeting, San Diego, CA

- 2- **2022:** *Early adaptation to increased mechanical loading after disuse: muscle response in male and female rats.* **Mortreux M**, Rosa-Caldwell ME, Sung DM, Stieh; ID, Rutkove SB. ACSM Annual Meeting, San Diego, CA
- 3- **2022:** *Resveratrol and electrical muscle stimulation as countermeasures to preserve sensorimotor function during a 60-day head-down bedrest protocol.* **Mortreux M**, Bouxsein ML, Newman D, Abitante T, Beheshti A, Rutkove SB. NASA HRP IWS Annual Meeting (Virtual)
- 4- **2022:** *Early muscular response to partial gravity following a bout of disuse in male and female rats.* **Mortreux M**, Rosa-Caldwell ME, Sung DM, Stiehl ID, Nagy JA, Rutkove SB. NASA HRP IWS Annual Meeting (Virtual)
- 5- **2022:** *Sex differences in the etiology of micro-gravity induced musculoskeletal losses are not solely dependent on sex hormones.* Rosa-Caldwell ME, **Mortreux M**, Sung DM, Schreurs S, Bouxsein ML, Kaiser U, Rutkove SB. NASA HRP IWS Annual Meeting (Virtual)
- 6- **2021:** *Hindlimb Suspension in Wistar rats: sex-based differences.* **Mortreux M**, Rosa-Caldwell ME, Sung D-M, Stiehl I & Rutkove SB. NASA HRP IWS Annual Meeting (Virtual)
- 7- **2021:** *Partial weight-bearing after a period of disuse does not impact early functional recovery.* Rosa-Caldwell ME, **Mortreux M**, Sung D-M, Stiehl I & Rutkove SB. NASA HRP IWS Annual Meeting (Virtual)
- 8- **2021:** *Musculoskeletal alterations in male and female rats exposed to micro- and partial gravity environments.* Rosa-Caldwell ME, **Mortreux M**, Sung DM, Schreurs AS, Bouxsein ML, Kaiser UB & Rutkove SB. APS New Trends in Sex and Gender Medicine Conference (Virtual)
- 9- **2020:** *Analysis of stress level and blood flow in a rat partial gravity analogue.* **Mortreux M**, Riveros D, Semple C, Bouxsein ML, and Rutkove SB. NASA HRP IWS Annual Meeting, Galveston, TX
- 10- **2020:** *Electrical Impedance Myography to detect muscle disuse in a rat analog model of partial gravity.* **Mortreux M**, Riveros D, Semple C, Nagy JA, Bouxsein ML, and Rutkove SB. NASA HRP IWS Annual Meeting, Galveston, TX
- 11- **2020:** *Partial weight-bearing in female rats: validation in a Martian-gravity analog.* Semple C, Riveros D, Nagy JA, Rutkove SB & **Mortreux M**. NASA HRP IWS Annual Meeting, Galveston, TX
- 12- **2019:** *A moderate daily dose of resveratrol mitigates muscle deconditioning in rats exposed to a Martian gravity analogue.* **Mortreux M**, Riveros D, Bouxsein ML, and Rutkove SB. NASA HRP IWS Annual Meeting, Galveston, TX
- 13- **2019:** *Dose-dependent skeletal deficits in rats by varied reductions in mechanical loading.* Ko FC, **Mortreux M**, Riveros D, Nagy JA, Rutkove SB, and Bouxsein ML. NASA HRP IWS Annual Meeting, Galveston, TX
- 14- **2019:** *Longitudinal time course of muscle deterioration in a rat model of partial gravity.* **Mortreux M**, Ko FC, Riveros D, Bouxsein ML, and Rutkove SB. NASA HRP IWS Annual Meeting, Galveston, TX
- 15- **2019:** *Novel partial weight-bearing model leads to dose-dependent skeletal deficits in rats.* Ko FC, **Mortreux M**, Riveros S, Nagy JA, Rutkove SB, and Bouxsein ML. ASBMR Annual Meeting, Orlando, FL
- 16- **2019:** *Electrical impedance myography goes global: collaborative efforts to advance a promising preclinical and clinical tool for the development of future DMD therapies.* van Putten M, Mantuano P, Aartsma-Rus A, De Luca A, Leitner M, Della Pазze L, Nagy JA, **Mortreux M**, Semple C, Rutkove SB. World Muscle Society Annual Meeting, Copenhagen, Denmark

- 17-2019:** *A moderate daily dose of resveratrol mitigates muscle deconditioning in rats exposed to a Martian gravity analogue (invited).* **Mortreux M**, Riveros D, Bouxsein ML, and Rutkove SB. Space Health Innovation Conference TRISH, San Francisco, CA
- 18-2019:** *Novel partial weight-bearing model leads to dose-dependent skeletal deficits in rats.* Ko FC, **Mortreux M**, Riveros S, Nagy JA, Rutkove SB, and Bouxsein ML. ASGSR Annual Meeting, Denver, CO
- 19-2019:** *Analysis of stress level and blood flow in a rat partial gravity analogue.* **Mortreux M**, Riveros D, Semple C, Bouxsein ML, and Rutkove SB. ASGSR Annual Meeting, Denver, CO
- 20-2018:** *A new partial gravity analog model in rats to investigate musculoskeletal alterations during spaceflight.* **Mortreux M**, Ko FC, Bouxsein ML, and Rutkove SB. NASA HRP IWS Annual Meeting, Galveston, TX
- 21-2018:** *A new partial gravity analog model in rats to investigate musculoskeletal alterations during spaceflight.* **Mortreux M**, Ko FC, Bouxsein ML, and Rutkove SB. ORS Annual Meeting, New Orleans, LA
- 22-2018:** *A new partial gravity analog model in rats to investigate musculoskeletal alterations during spaceflight.* **Mortreux M**, Ko FC, Bouxsein ML, and Rutkove SB. ASGSR Annual Meeting, Bethesda, MD
- 23-2017:** *Electrical impedance myography identifies age-associated changes in mouse gastrocnemius muscle.* Taylor R, Li J, Shin C, **Mortreux M**, Sanchez B, Nagy JA, and Rutkove SB. AAN Annual Meeting, Boston, MA
- 24-2017:** *Electrical impedance myography as surrogate measure of myofiber size.* Li J, Taylor R, Pacheck A, Shin C, **Mortreux M**, Sanchez B, Nagy JA, and Rutkove SB. AAN Annual Meeting, Boston, MA
- 25-2015:** *Olfactory-bulbar Prokineticin-2 is involved in the regulation of food intake and energy homeostasis through a GLP-1R dependent mechanism.* **Mortreux M**, Kassis N, Burcelin R, Drucker DJ, Magnan C, Migrenne-Li S. EASD Annual Meeting, Stockholm, Sweden
- 26-2014:** *Implication de la Prokinéticine-2 Olfacto-Bulbaire dans la Régulation de la Prise Alimentaire et de l'Homéostasie Glucidique [French] (Implication of the olfactory-bulbar Prokineticin-2 in the regulation of food intake and glucose homeostasis).* **Mortreux M**, Kassis N, Magnan C, Migrenne-Li S. SFD Annual Meeting, Paris, France.
- 27-2013:** *L'augmentation hépatique de Dyrk1a peut-elle protéger de la stéato-hépatite due à une consommation d'alcool ? [French] (Is the hepatic augmentation of Dyrk1a able to protect from the steato-hepatite due to alcohol consumption?).* Janel N, Renon M, Bokobza C, **Mortreux M**, Paul J, Delabar J. AFEF Meeting, Lille, France

HONORS AND AWARDS

- 2021** **Recipient of the CRITTER award from the Institutional Animal Care and Use Committee.** (Conscientious Researcher Involved in or Tending to Treating animals Ethically and Respectfully)
- 2020** **Honorable Mention for scientific artwork** at the American Society for Gravitational and Space Research Annual Meeting
- 2020** **Featured as one of the 1 Million Women in Science**
- 2019** **Best postdoctoral poster presentation** at the NASA Human Research Program Investigators Workshop (2nd place)

2015 **Best oral communication** at the BFA Unit Young Researcher Symposium, Paris, France

GRANTS

2022 R01 Grant Proposal

Advancing next-generation EMG: integrated impedance electromyography in rodent models of neuromuscular disease

Role: Co-Investigator

Status: under review

2022 ACSM Research Grant Proposal

Comparing musculoskeletal response to single and multiple bouts of energy restriction between males and females

Role: Collaborator

Status: not funded

2022 R21 Grant Proposal

Electrophysiological estimation of skeletal muscle specific force in neuromuscular disease

Role: Co-Investigator

Status: under review

2022 BRASH Grant Proposal

Novel small molecule therapies to enhance motor performance in long-duration space flight

Role: Co-Investigator

Status: not funded

2022 NASA Grant Proposal – Space Biology

Characterization of female reproductive health risks for long-duration spaceflight using Federated Machine Learning

Role: Collaborator

Status: under review

2022 NASA Grant Proposal – Space Biology

Acute and long-term effects of combined radiation and partial unloading on neurological and musculoskeletal systems in male and female rats

Role: Co-Investigator

Status: under review

2022 NASA Grant Proposal Early Career Investigator – Space Biology

Circadian rhythm disruption and gravitational disturbance in a Lunar mission analog: consequences for muscle function during and after the mission

Role: Principal Investigator

Status: under review

2021 NASA Grant Proposal – Human Research Program

Enhancing exercise adaptations in simulated microgravity environments

Role: Principal Investigator

Status: not funded

2021 NASA Grant Proposal – Human Research Program

Modulation of energy balance and homeostasis to mitigate musculoskeletal disuse in a microgravity analog

Role: Principal Investigator

Status: not funded

- 2021 TRISH Grant Proposal**
Mitochondrial specific miRNAs utilized to reverse metabolic processes impacting spaceflight
Role: Co-Investigator *Status: not funded, score top 20%*
- 2021 NASA Grant Proposal – Space Biology**
A systems biology approach to dissect space radiation and microgravity central nervous system health risk driven by the mitochondria
Role: Co-Investigator *Status: not funded, score “fair”*
- 2021 NASA Grant proposal – Space Biology**
Assessing metabolic, circadian and sensorimotor alterations in male and female rats using lunar and Martian-missions analogs
Role: Co-Investigator *Status: not funded, score “very good”*
- 2021 NASA Grant proposal – Space Biology**
Investigating optimal exercise dosing using high intensity interval training in a lunar analog
Role: Co-Investigator *Status: not funded*
- 2021 R01 NIH Grant Proposal**
Speeding muscle recovery after injury or prolonged hospitalization in older adults: mechanistic and pharmacologic studies using a novel preclinical progressive weight-bearing model
Role: Co-Investigator *Status: not funded*
- 2020 NASA Grant Proposal – Space Biology**
Multi-system effects and interactions of partial gravity: a study in male and female rats
Role: Co-Investigator *Status: not funded, score top 20%*
- 2020 NASA Grant Proposal New Space Biology Investigator**
Resveratrol to preserve muscle health during a trip to the Moon and back: an analogue study in female rats
Role: Principal Investigator *Status: not funded, score top 20%*
- 2020 NASA Grant Proposal – Human Research Program**
Circulating miRNAs targeting specific nutritional factors for countermeasures against SANS
Role: Co-Investigator *Status: not funded, score top 20%*
- 2020 NASA Grant Proposal – Human Research Program**
Resveratrol and electrical muscle stimulation as countermeasures to preserve sensorimotor function during a 60-day head-down bedrest protocol
Role: Co-Investigator *Status: Awarded (\$750,000 Total Cost)*
Currently Active
- 2019 NASA Grant Proposal – Space Biology**
Effects of simulated microgravity and partial unloading on organ systems of the body
Role: Co-Investigator *Status: Awarded (\$1,200,000 Total Cost)*
Currently Active

- 2019 NASA Grant Proposal – Space Biology**
 Approaching gravity as a continuum: musculoskeletal effects of fractional reloading
Role: Research Scientist *Status: Awarded (\$750,000 Total Cost)*
Currently Active
- 2018 NASA Augmentation Proposal – Space Biology**
 As a postdoctoral fellow, obtained an augmentation for an expiring grant (NNX16AL36G) to investigate stress and blood flow in animals exposed to partial weight-bearing
Role: Postdoctoral Fellow *Status: Awarded (\$136,785 Total Cost)*
- 2018 NASA Postdoctoral Fellowship**
 Improving muscle health on Mars: Resveratrol supplementation to augment the benefits of exercise in a 0.4g analog model
Role: Postdoctoral Fellow *Status: Not funded*
- 2017 TRI Postdoctoral Fellowship**
 Studies of combined countermeasures to maintain muscle health in partial gravity: a focus on Mars
Role: Postdoctoral Fellow *Status: Not funded*
- 2015 Fondation pour la Recherche Médicale (FRM)**
 PhD grant for a 6 month extension
Role: Principal Investigator *Status: Awarded (€18,300, 6 months)*
- 2015 Travel Grant**
 EASD Annual Meeting in Stockholm, Sweden *Status: Awarded (€1,500)*
- 2015 Travel Grant**
 SFD Annual Meeting in Bordeaux, France *Status: Awarded (€450)*
- 2012 PhD Scholarship**
 CORDDIM (Cardio Obésité Rein Diabète Domaine D’Intérêt Majeur)
Role: PhD Fellow *Status: Awarded (€97,200, 36 months)*

PROFESSIONAL TRAINING

Harvard Catalyst

Introduction to ‘omics Research
 10/07/2020-03/24/2021

Harvard Catalyst

NIH Funding: Navigating the R01 & K Grant Submission Process
 06/09/2021-09/04/2021

Lunar Biology Technology Workshop
Gathertown (online platform)
April 2022

PROFESSIONAL AFFILIATIONS

- North Eastern Chapter of the American College for Sports Medicine (NEACSM, current chapter membership)
- American College for Sports Medicine (ACSM, current professional membership)
- American Society for Gravitational and Space Research (ASGSR, current membership)
- Orthopaedic Research Society (ORS, lapsed membership)
- European Association for the Study of Diabetes (EASD, lapsed membership)

PROFESSIONAL SERVICE

American Society for Gravitational and Space Research Annual Meetings

2019-Present Judge for the student competitions

2021 Abstract reviewer for the annual meeting

***Ad hoc* Reviewer:**

- Acta Physiologica
- NPJ Microgravity
- Neuroscience Letters
- Laboratory Animals
- Life Sciences in Space Research
- Life
- Scientific Reports
- British Journal of Pharmacology

Publons reviewer profile: <https://publons.com/researcher/1629067/marie-mortreux/peer-review/>

TEACHING EXPERIENCE

2019-Present Skype a Scientist

- Taught classes using online platforms in numerous establishments in neurosciences, animal physiology, genetics, and space biology
- High School and AP Biology levels
- Grade School levels
- Intervened in several countries, teaching in English and French
 - United States
 - Canada
 - Lithuania
 - France

- The Netherlands

**2019-2021 University of Central Lancashire, UK
Invited Lecturer**

- Taught Career workshops for biomedical students

**2013-2015 Université Paris Diderot, France
Teaching Assistant, Department of Biology**

- Taught Animal Physiology, Renal Physiology, Reproductive Physiology and Scientific Methodology
- Developed quizzes, exams, and homework
- Developed and taught lab classes including rodent surgeries
- Graded lab and theoretical exams

MENTORSHIP

- 2022 Margot Issertine** – Master’s student, Université de Montpellier, France
Supervisor for her 6 month Masters internship and responsible for overseeing lab work, analysis and the redaction of her thesis.
- 2020-Present Megan E. Rosa-Caldwell, PhD** – Postdoctoral Fellow
- 2020-2021 Ian D. Stiehl** – Undergraduate Student, Dartmouth College, NH
- 2019-Present Dong-Min Sung** – Research Assistant
- 2018-2020 Carson Semple** – Research Assistant
- 2018-2020 Daniela Riveros Acosta, MD** – Research Fellow
- 2015 Antoine Landry** – Master’s student, Agro Paris Tech, France
- 2015 Adrien Eichmuller** – Undergraduate student, Université Paris Diderot, France
- 2015 Thomas Schwob** – Undergraduate student, Université Paris Diderot, France
- 2015 Margot Morin-Dewaele** – Undergraduate student, Université Paris Diderot, France
- 2014 Sara Mouasni** – Master’s student, Université Paris Diderot, France
- 2014 Margot Morin-Dewaele** – Undergraduate student, Université Paris Diderot, France
- 2014 Pauline Kraus** – Undergraduate student, Université Paris Diderot, France
- 2014 Emma Philippon** – Undergraduate student, Université Paris Diderot, France
- 2013 Léa Morisset** – Master’s student, Agro Paris Tech, France
- 2013 Rodolphe Marhic** – Undergraduate student, Université Paris Diderot, France
- 2013 Justine Zulini** – Undergraduate student, Université Paris Diderot, France
- 2011 Patrick Hurley** – Undergraduate student, Yale University, CT

COMMUNITY SERVICE

BIDMC Postdoctoral Association (2019-Present)

Co-Founder and Chair of the Advocacy Committee, Boston, MA

- Partnered with Harvard Medical School Postdoctoral Association
- Worked to be included in the Boston Postdoctoral Association

- Provided National Postdoctoral Association Membership to all eligible scientists at BIDMC
- Negotiated and obtained the establishment of a minimum salary for postdocs
- Involved in committees and focus groups at the institutional level

BioSPC Graduate School (Formerly GC2ID) (2013-2015)

Elected representative for the PhD students, Paris, France

- Participated in meetings with the graduate schools
- Member of the jury for the selection of PhD fellowships
- Responsible for organizing seminars and workshops
- Responsible for handling disputes between PhD students and their advisors

LANGUAGES

French: Native Language

English: Fluent

Spanish: Advanced

Italian: Intermediate

Portuguese: Novice

Russian: Learning

COMPUTER SKILLS

Softwares: GraphPad Prism, Matlab, Office Package, ImageJ, FIJI, Aurora Scientific Systems

OTHER

Avid bookworm and tea connoisseur, world traveler to learn cultures and languages

Driving license (French and American), CPR certification since 2013