Rance Solomon

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Education

- **SUNY at Buffalo** — **Buffalo, NY, USA**
  PhD in Physics, specialization: Cosmology & Astrophysics, — *August 2016 – Present*
- **Middle Tennessee State University** — **Murfreesboro, TN, USA**
  B.S. in Physics, specialization: Biophysics & Quantum Optics, — *January 2011 – May 2015*

Research Experience

- **Research Assistant: Cosmology/Astrophysics (Theory)** — **December 2017 – Present**
  Department of Physics, UB, Advisor: Dr. Dejan Stojkovic — *Buffalo, NY*

  Made theoretical studies in the swampland conjectures and a modified recombination history. Ongoing work uses:
  - quasar light curves to promote quasars to standard candles
  - strong lensed galaxies to constrain modified gravity theories.
- **Research Assistant: Quantum Optics (Experiment)** — **May 2014 – May 2015**
  Department of Physics, MTSU, Advisor: Dr. Daniel Erenso — *Murfreesboro, TN*

  Constructed a quantum optics lab centered on spontaneous parametric down conversion via BBO crystals.
- **Research Assistant: Biophysics (Experiment)** — **July 2011 – May 2015**
  Department of Physics, MTSU, Advisor: Dr. Daniel Erenso — *Murfreesboro, TN*

  Studied the malleability of both red blood cells and breast cells through the application of laser tweezers in order to study the efficacy of medical treatments on both sickle cell disease and breast cancer.
- **Research Assistant: Physics Education** — **February 2011 – July 2011**
  Department of Physics, MTSU, Advisor: Dr. Brian Frank — *Murfreesboro, TN*

  Observed students and high school teachers in classroom settings to study the effectiveness of the "flipped classroom" method. Attended INSPIRE 2011, a week long workshop in Seattle, Washington for the study of tools in educational learning in the STEM fields.

Selected Publications

ORCiD: 0000-0003-0693-2469

[1] R. Solomon, G. Agarwal and D. Stojkovic, "Environment Dependent Electron Mass and the H_0-Tension," [arXiv:2201.03127 [hep-ph]].

[2] R. Solomon and D. Stojkovic, "Variability in Quasar Light Curves: using quasars as standard candles," [arXiv:2110.03671 [astro-ph.CO]].

[3] W. C. Lin and R. M. Solomon, "Generalizing the swampland: Embedding $P(X, \varphi)$ inflationary theories in a curved multifield space," Phys. Rev. D **103**, no.6, 063533 (2021) doi:10.1103/PhysRevD.103.063533 [arXiv:2101.00497 [hep-th]].

[4] R. Solomon and D. Stojkovic, "Generalizing weak gravity conjecture," Phys. Rev. D **102**, no.4, 4 (2020) doi:10.1103/PhysRevD.102.046016 [arXiv:2008.03749 [gr-qc]].

Talks and Presentations

- **University Express** — **Public**
  The Astronomical Twilight Zone — *November 2021*
- **Pheno 2021** — **Online**
  Quasars as Standard Candles — *May 2021*
- **University Express** — **Public**
  Our Predictable Universe — *May 2021*
- **Celestial Journey (Penny Burchfield Arts Center)** — **Public**
  The Science of Copernicus, *Panelist* — *February 2019*

- **Buffalo Astronomy Association** — **Public**
  Superfluid Dark Matter — *October 2018*

Awards and Honors

- **Om and Saraswati Bahethi Scholarship** — **SUNY at Buffalo**
  Deparment of Physics — *December 2021*
  Awarded to students for excellent academic performance
- **Frank B. Silvestro Fellowship** — **SUNY at Buffalo**
  Department of Physics — *March 2021*
  Awarded to students showing academic promise
- **Outstanding Teaching Assistant Prize** — **SUNY at Buffalo**
  Department of Physics — *July 2019*
  Awarded to teaching assistants who demonstrate superior instructional skills while serving in the classroom
- **Berhanu Welde Michael Memorial Award for Excellence in Physics Research** — **MTSU**
  Department of Physics — *April 2014*
  Awarded to students showing research promise

Software and Hardware skills

- **Programming Languages:**
  Proficient in: C++, Python, Mathematica, MATLAB, Arduino, TeX.
- **Code Management Tools:**
  Git, Jupyter.

Relevant Interests

- illustration
- electronic detectors / robotics
- vehicle mechanical repair
- science communication