

### EDUCATION

- Postdoc. **University of California, Berkeley**, *California Institute for Quantitative Biosciences*  
2011 – 2016 Advisor: Adam P. Arkin; Fields: Systems Biology and Synthetic Biology
- Postdoc. **University of Michigan**, *Department of Aerospace Engineering*  
2010 – 2011 Advisor: Ilya V. Kolmanovsky; Fields: System Modeling and System Identification
- Ph.D. **University of Michigan**, *Department of Aerospace Engineering*  
2007 – 2010 Advisor: Pierre T. Kabamba; Fields: Stochastic Optimization and Evolutionary Computation  
Dissertation: “Selective Evolutionary Generation Systems: Theory and Applications”
- M.S.E. **University of Michigan**, *Department of Aerospace Engineering*  
2005 – 2006 Advisor: Pierre T. Kabamba; Specialization: Flight Dynamics and Controls
- B.A.Sc. **University of Waterloo**, *Department of Mechanical Engineering*  
2000 – 2005 Advisor: Jan P. Huissoon; Options: Mechatronics and Management Sciences  
Sandford Fleming Co-op Medal; Dean’s Honors List (top 10%); Distinction
- Glider Flt. **Central Region Gliding School**, *Transport Canada Glider Pilot’s License and Glider Instructor Rating*  
1999, 2005 Glider licensed since 1999; Instructor-rated during 2005–2011
- Power Flt. **National Flyers Academy**, *Transport Canada Private Pilot’s License and Night Rating*  
2000 Single engine licensed and night-rated since 2000
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### POSITIONS HELD

- 2017 – **University of Florida**, *Department of Mechanical and Aerospace Engineering*  
Assistant Professor, appointed 8/16/2017  
Affiliate, *J. Crayton Pruitt Family Department of Biomedical Engineering*, appointed 11/8/2017  
Affiliate, *Department of Agricultural and Biological Engineering*, appointed 1/24/2018
- 2016 – 2017 **University of California, Berkeley**, *California Institute for Quantitative Biosciences*  
Associate Project Scientist
- 2001 – 2010 **Royal Canadian Air Force**, *Cadet Instructor Cadre, Central Ontario Gliding Centre*  
Glider Flight Instructor, Glider Flight Familiarization Pilot
- 2004 **ATS Automation Tooling Systems, Inc.**  
Systems Designer, Research and Development
- 2003 **Messier-Dowty, Inc.**  
Stress Engineering Analyst
- 2002, 2003 **Husky Injection Molding Systems, Ltd.**  
Mechanical Engineering Designer
- 2001 **MacDonald Dettwiler Space and Advanced Robotics, Ltd.**  
NASA Shuttle Remote Manipulator System (Canadarm) Product Assurance
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### RESEARCH INTERESTS

My group specializes in the modeling and control of biological processes. We engineer mammalian, bacterial, and plant systems for medical and space applications. We have both experimental (wet) and computational (dry) lab capabilities.

Systems Biology	We investigate the use of feedback control to manipulate the concentrations of proteins that are involved in inflammation-mediated coagulation disorders. Two such disorders are: (1) trauma-induced coagulopathy, which occurs after severe trauma and shock, is characterized by uncontrolled bleeding, and has poor treatment outcomes (e.g., 30% mortality for trauma patients that require massive transfusions); and (2) infection-induced coagulopathy in the lung, which results in blood clots and contributes to lung fibrosis.
Positive Systems	We advance the deterministic and stochastic theory of biomolecular systems to program their robustness. These systems belong to the class of dynamical systems whose states are restricted to non-negative values.
Space Biosystems Eng.	We design biomanufacturing processes and systems for Mars deployment. This is a useful payload minimization approach for long-duration space missions, a fact that we quantitatively established. We optimally integrate various systems such that the performance of a resultant factory meets specifications.
Space Synthetic Biology	We engineer microbes to reject an extreme and harsh environment. We build and test genetic regulatory modules to improve the space biomanufacturing performance of different bacteria over their baselines.

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## RESEARCH FUNDING

**Total Secured: \$5,184,591**

### Current Funding

2023 – 2025	<b>DoD CDMRP Restoral</b> , Co-I, “Applied Systems Biology for Trauma Coagulopathy Tailored for the Combat Casualty,” \$175,000 share.
2023 – 2025	<b>UF Research Opportunity Seed Fund</b> , PI, “DRPD-ROSF2023: Developing Personalized Protein Interventions to Treat Infection-Mediated Pulmonary Hemorrhage,” \$90,000.
2023 – 2027	<b>NASA STMD</b> , PI, “Controlled Therapeutic Biomanufacturing for Deep Space Missions,” \$336,000.
2022 – 2024	<b>DARPA BTO</b> , PI, “Efficient and Resilient Biomanufacturing in Variable Gravity,” \$3,207,461.
2022 – 2025	<b>NASA STMD</b> , <i>Space Technology Research Institute</i> , Co-I, “Center for the Utilization of Biological Engineering in Space II (CUBES II),” \$270,000 share of \$4,498,176.

### Completed Funding

2017 – 2023	<b>NASA STMD</b> , <i>Space Technology Research Institute</i> , Co-I and Science PI, “Center for the Utilization of Biological Engineering in Space (CUBES),” \$789,237 share of \$15,000,000.
2022	<b>Florida Space Institute SRI</b> , Co-I, “Characterizing Resistance Evolution of Azole-treated Opportunistic Fungal Pathogen <i>Candida albicans</i> under Simulated Microgravity,” \$13,753 share of \$96,178.
2021 – 2022	<b>UF Informatics Institute SEED</b> , PI, “AI-Guided Gene-Based Dynamic Crop Models for Space Life Support,” \$24,000.
2019 – 2020	<b>UF TARGET</b> , Co-I, “Factfinding for a UF Biofoundry,” \$1,991 share of \$7,615.
2017 – 2018	<b>DARPA BTO</b> , Co-I, “Programmed Cellular Self-Optimization to Tailor Antibiotic Delivery,” \$277,149 share.

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## HONORS AND AWARDS

2019	Anderson Scholar Faculty Honoree, University of Florida
2015	Emerging Leader in Biosecurity, University of Pittsburgh Medical Center’s Center for Health Security
2015	Fellow, Synthetic Biology Leadership Excellence Accelerator Program
2011	Policy Leader (top 50/1200), Public Service of Canada
2007, 2010	Best Presentation in Session, American Control Conference

2008 – 2010	Natural Sciences and Engineering Research Council of Canada Post-Graduate Scholarship
2009	Michigan Teaching Fellow, University of Michigan
2008	Best Presentation in Session, Dynamic Systems and Control Conference
2005 – 2006	Milo E. Oliphant Fellowship, University of Michigan
2005	Ontario Engineering Competition Team A, University of Waterloo
2004	First Place in Mini-Sumo Robot Competition, University of Waterloo
2000 – 2004	Arthur F. Church Mechanical Engineering Academic Scholarship, University of Waterloo
2000 – 2004	Toronto Transportation Club Scholarship
2000 – 2004	Queen Elizabeth II Aiming for the Top Scholarship
2003	Husky Injection Molding Systems Co-op and Academic Scholarship, University of Waterloo
2001 – 2003	Sir Sandford Fleming Outstanding Co-op Work Term Report Awards, University of Waterloo
2002	Sir Sandford Fleming Technical Speaking Faculty of Engineering Champion, University of Waterloo

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## REFEREED PUBLICATIONS

### Key for Author Relationships

Underline:	Senior or Principal Author(s)
Bold:	Self
Superscript F:	Mentored Research Fellow (such as a visiting scientist)
Superscript P:	Mentored Postdoctoral Researcher (work performed during postdoc term)
Superscript G:	Mentored Graduate Student (work performed during graduate school)
Superscript U:	Mentored Undergraduate Student (work performed during undergraduate studies)
Superscript A:	Former mentored student / alumni (work performed after graduation)
Superscript ‡:	Alphabetical author listing

### Journal Papers

18. Damon E. Ghetmiri<sup>G</sup>, Alessia J. Venturi<sup>U</sup>, Mitchell J. Cohen, and **Amor A. Menezes**. Quick model-based viscoelastic clot strength predictions from blood protein concentrations for cybermedical coagulation control. In press, *Nature Communications*, 2023.
17. Damon E. Ghetmiri<sup>G</sup> and **Amor A. Menezes**. Nonlinear dynamic modeling and model predictive control of thrombin generation to treat trauma-induced coagulopathy. *International Journal of Robust and Nonlinear Control*, 33(9):5128–5144, June 2023.
16. Andras Gyorgy, **Amor Menezes**, and Murat Arcak. A blueprint for a synthetic genetic feedback optimizer. *Nature Communications*, 14:2554, May 3, 2023.
15. Damon E. Ghetmiri<sup>G</sup> and **Amor A. Menezes**. Control of positive systems with an unknown state-dependent power law input delay and input saturation. *Automatica*, 151:110853, May 2023.
14. Aaron J. Berliner, Isaac Lipsky, Davian Ho, Jacob M. Hilzinger, Gretchen Vengerova, Georgios Makrygiorgos, Matthew J. McNulty, Kevin Yates, Nils J.H. Aversch, Charles S. Cockell, Tyler Wallentine, Lance C. Seefeldt, Craig S. Criddle, Somen Nandi, Karen A. McDonald, **Amor A. Menezes**, Ali Mesbah, and Adam P. Arkin. Space bioprocess engineering on the horizon. *Communications Engineering*, 1:13, June 21, 2022.
13. Damon E. Ghetmiri<sup>G</sup>, Mitchell J. Cohen, and **Amor A. Menezes**. Personalized modulation of coagulation factors using a thrombin dynamics model to treat trauma-induced coagulopathy. *npj Systems Biology and Applications*, 7:44, December 7, 2021.
12. Aaron J. Berliner, Jacob M. Hilzinger, Anthony J. Abel, Matthew J. McNulty, George Makrygiorgos, Nils J.H. Aversch, Soumyajit Sen Gupta<sup>P</sup>, Alexander Benvenuti<sup>U</sup>, Daniel F. Caddell, Stefano Cestellos-Blanco, Anna Doloman, Skyler Friedline, Desiree Ho, Wenyu Gu, Avery Hill, Paul Kusuma, Isaac Lipsky, Mia

- Mirkovic, Jorge Luis Meraz, Vincent Pane, Kyle B. Sander, Fengzhe Shi, Jeffrey M. Skerker, Alexander Styer, Kyle Valgardson, Kelly Wetmore, Sung-Geun Woo, Yongao Xiong, Kevin Yates, Cindy Zhang, Shuyang Zhen, Bruce Bugbee, Douglas S. Clark, Devin Coleman-Derr, Ali Mesbah, Somen Nandi, Robert W. Waymouth, Peidong Yang, Craig S. Criddle, Karen A. McDonald, Lance C. Seefeldt, **Amor A. Menezes**, and Adam P. Arkin. Towards a biomanufactory on Mars. *Frontiers in Astronomy and Space Sciences*, 8:711550, July 2021.
11. **Amor A. Menezes**, Dhaval D. Shah<sup>G</sup>, and Ilya V. Kolmanovsky. An evaluation of stochastic model-dependent and model-independent glider flight management. *IEEE Transactions on Control Systems Technology*, 26(3):1040–1056, May 2018.
  10. **Amor A. Menezes**, Ryan F. Vilardi, Adam P. Arkin, and Mitchell J. Cohen. Targeted clinical control of trauma patient coagulation through a thrombin dynamics model. *Science Translational Medicine*, 9(371):eaaf5045, January 4, 2017.
  9. **Amor A. Menezes** and Pierre T. Kabamba. Efficient and resilient micro air vehicle flapping wing gait evolution for hover and trajectory control. *Engineering Applications of Artificial Intelligence*, 54:1–16, September 2016.
  8. **Amor A. Menezes** and Pierre T. Kabamba. Efficient search and responsiveness trade-offs in a Markov chain model of evolution in dynamic environments. *Mathematical Biosciences*, 276:44–58, June 2016.
  7. **Amor A. Menezes**, Michael G. Montague, John Cumbers, John A. Hogan, and Adam P. Arkin. Grand challenges in space synthetic biology. *Journal of the Royal Society Interface*, 12(113):20150803, December 6, 2015. **Headline review article in synthetic biology.**
  6. **Amor A. Menezes**, John Cumbers, John A. Hogan, and Adam P. Arkin. Towards synthetic biological approaches to resource utilization on space missions. *Journal of the Royal Society Interface*, 12(102):20140715, January 6, 2015. **Cover article.**
  5. **Amor A. Menezes** and Pierre T. Kabamba. Optimal search efficiency of Barker’s algorithm with an exponential fitness function. *Optimization Letters*, 8(2):691–703, February 2014.
  4. Chris Vermillion, **Amor Menezes**, and Ilya Kolmanovsky. Stable hierarchical model predictive control using an inner loop reference model and  $\lambda$ -contractive terminal sets. *Automatica*, 50(1):92–99, January 2014.
  3. <sup>‡</sup>Yongsoo Eun, Eric M. Gross, Pierre T. Kabamba, Semyon M. Meerkov, **Amor A. Menezes**, and Hamid R. Ossareh. Cyclic control: Problem formulation and stability analysis. *ASME Journal of Dynamic Systems, Measurement, and Control*, 135(5):051012-1–051012-9, September 2013.
  2. <sup>‡</sup>Yongsoo Eun, Eric M. Gross, Pierre T. Kabamba, Semyon M. Meerkov, **Amor A. Menezes**, and Hamid R. Ossareh. Cyclic control: Reference tracking and disturbance rejection. *IEEE Transactions on Control Systems Technology*, 21(3):753–764, May 2013.
  1. **Amor A. Menezes** and Pierre T. Kabamba. Optimal seeding of self-reproducing systems. *Artificial Life*, 18(1):27–51, 2012.

## Conference Papers

20. Damon E. Ghetmiri<sup>G</sup>, Miguel E. Perez Blanco<sup>U</sup>, Mitchell J. Cohen, and **Amor A. Menezes**. Control-theoretic modeling and prediction of blood clot viscoelasticity in trauma patients. In *IFAC-PapersOnLine, Proceedings of the 2021 Modeling, Estimation and Control Conference*, 54(20):232–237, October 24–27, 2021.
19. George Makrygiorgos, Soumyajit Sen Gupta<sup>P</sup>, **Amor A. Menezes**, and Ali Mesbah. Fast probabilistic uncertainty quantification and sensitivity analysis of a Mars life support system model. In *IFAC-PapersOnLine, Proceedings of the 21st IFAC World Congress*, 53(2):7268–7273, July 12–17, 2020.
18. Andras Gyorgy, **Amor Menezes**, Murat Arcak. A genetic optimizer module for synthetic biology. In *Proceedings of the 21st IFAC World Congress*, July 12–17, 2020.

17. Saige R. Drecksler<sup>U</sup>, Soumyajit Sen Gupta<sup>P</sup>, Alexander J. Benvenuti<sup>U</sup>, and **Amor A. Menezes**. Effects of space biomanufacturing on fuel production alternatives for exploration missions. In *Proceedings of the 50th International Conference on Environmental Systems*, ICES-2020-499, July 12–16, 2020.
16. Alexander J. Benvenuti<sup>U</sup>, Saige R. Drecksler<sup>U</sup>, Soumyajit Sen Gupta<sup>P</sup>, and **Amor A. Menezes**. Design of anaerobic digestion systems for closed loop space biomanufacturing. In *Proceedings of the 50th International Conference on Environmental Systems*, ICES-2020-498, July 12–16, 2020.
15. **Amor A. Menezes** and Ilya V. Kolmanovsky. Energy and power management in a series hybrid electric vehicle using selective evolutionary generation. In *Proceedings of the 53rd IEEE Conference on Decision and Control*, pages 3310–3315, December 15–17, 2014.
14. Dhaval D. Shah<sup>G</sup>, **Amor A. Menezes**, and Ilya V. Kolmanovsky. Glider flight environment modeling for optimal control. In *Proceedings of the 2012 American Control Conference*, pages 926–931, June 27–29, 2012.
13. <sup>†</sup>Yongsoo Eun, Eric Gross, Pierre Kabamba, Semyon Meerkov, **Amor Menezes**, and Hamid Ossareh. Cyclic control: The case of static output feedback. In *Proceedings of the 18th IFAC World Congress*, pages 9181–9187, August 28–September 2, 2011.
12. **Amor A. Menezes** and Pierre T. Kabamba. Efficient and responsive stochastic optimization. In *Proceedings of the 18th IFAC World Congress*, pages 4735–4740, August 28–September 2, 2011.
11. Chris Vermillion, **Amor Menezes**, and Ilya Kolmanovsky. Stable hierarchical model predictive control using an inner loop reference model. In *Proceedings of the 18th IFAC World Congress*, pages 9278–9283, August 28–September 2, 2011.
10. Ilya V. Kolmanovsky and **Amor A. Menezes**. A stochastic drift counteraction optimal control approach to glider flight management. In *Proceedings of the 2011 American Control Conference*, pages 1009–1014, June 29–July 1, 2011.
9. **Amor A. Menezes** and Pierre T. Kabamba. Selective evolutionary generation: A model for optimally efficient search in biology. In *Proceedings of the 2011 American Control Conference*, pages 4117–4122, June 29–July 1, 2011.
8. **Amor A. Menezes** and Pierre T. Kabamba. Rational behavior design using multi-selective generation. In *Proceedings of the 49th IEEE Conference on Decision and Control*, pages 3938–3943, December 15–17, 2010.
7. <sup>‡</sup>ShiNung Ching, Yongsoo Eun, Eric Gross, Eric Hamby, Pierre Kabamba, Semyon Meerkov, and **Amor Menezes**. Modeling and control of cyclic systems in xerography. In *Proceedings of the 2010 American Control Conference*, pages 4283–4288, June 30–July 2, 2010.
6. **Amor A. Menezes** and Pierre T. Kabamba. Resilient self-reproducing systems. In *Proceedings of the 2008 ASME Dynamic Systems and Control Conference*, number DSCC2008-2284, October 20–22, 2008.
5. **Amor A. Menezes** and Pierre T. Kabamba. Optimal seeding of a class of self-reproducing systems. In *Proceedings of the AIAA Guidance, Navigation and Control Conference and Exhibit*, number AIAA-2008-7272, August 18–21, 2008.
4. **Amor Menezes** and Pierre Kabamba. An optimal-seed identification algorithm for self-reproducing systems. In *Proceedings of the 58th International Astronautical Congress*, number IAC-07-D3.2.02, September 24–28, 2007.
3. **Amor Menezes** and Pierre Kabamba. A combined seed-identification and generation analysis algorithm for self-reproducing systems. In *Proceedings of the 2007 American Control Conference*, pages 2582–2587, July 11–13, 2007.
2. **Amor Menezes** and Pierre Kabamba. Information requirements for self-reproducing systems in lunar robotic colonies. In *Proceedings of the 57th International Astronautical Congress*, number IAC-06-A5.P.04, October 2–6, 2006.

1. **Amor Menezes**, Rowena Luk, Paul T. Y. Lam, and Ziad Bhunnoo. Applying Martian rover technology to solve terrestrial problems — the development of an Autonomous Cold-Trailing Omnirange Robot (ACTOR). In *Proceedings of the 56th International Astronautical Congress*, number IAC-05-E2.3.03, October 17–21, 2005.

## Conference Abstracts

17. Amanda E. Shick<sup>G</sup>, Damon E. Ghetmiri<sup>G</sup>, Michael E. Langston, Faye M. Pais, Mitchell J. Cohen, and **Amor A. Menezes**. Activated protein C as a potential therapeutic for modeled COVID-19-induced fibrin accumulation. *International Conference on Complexity in Acute Illness 2023*, September 8–10, 2023. **Selected for oral presentation.**
16. Amanda E. Shick<sup>G</sup>, Luis Sordo Vieira, Bornha Mehrad, and **Amor A. Menezes**. Adapting control-oriented coagulation models to generate candidate protein therapies for invasive pulmonary aspergillosis. *International Conference on Complexity in Acute Illness 2023*, September 8–10, 2023.
15. Georgios Makrygiorgos, Aaron J. Berliner, Anthony Abel, Stefano Cestellos-Blanco, Jeremy Adams, Nishi Thapliyal, **Amor Menezes**, Peidong Yang, Douglas S. Clark, Adam P. Arkin, and Ali Mesbah. An end-to-end design and system integration for biomanufacturing on Mars under uncertainty. *AIChE Annual Meeting*, November 12–18, 2022. **Selected for oral presentation.**
14. Matthew Chertok<sup>U</sup> and **Amor A. Menezes**. Engineered *Escherichia coli* for anticoagulant bioproduction in space. *AIChE Annual Meeting*, November 12–18, 2022.
13. Jithran Ekanayake<sup>G</sup>, Soumyajit Sen Gupta<sup>P</sup>, Jacob D. York<sup>U</sup>, Ana D. Martin-Ryals, and **Amor A. Menezes**. Low-shear modeled microgravity reduces *Cupriavidus basilensis* growth rate and biopolymer production. *ASGSR Annual Meeting*, November 9–12, 2022.
12. Anya Volter<sup>G</sup>, Kevin Yates, Imran Khan, Somen Nandi, Karen A. McDonald, and **Amor A. Menezes**. Modeled environmental feedforward control to recover losses in therapeutic production by transgenic lettuce in microgravity. *ASGSR Annual Meeting*, November 9–12, 2022. **Selected for oral presentation.**
11. Soumyajit Sen Gupta<sup>P</sup>, George Makrygiorgos, Ali Mesbah, and **Amor A. Menezes**. Optimal scheduling of integrated processes under uncertainty for biomanufacturing on Mars. *AIChE Annual Meeting*, November 7–11, 2021. **Selected for oral presentation.**
10. Damon E. Ghetmiri<sup>G</sup>, Miguel E. Perez Blanco<sup>U</sup>, and **Amor A. Menezes**. Dynamical system modeling of plasma sample thromboelastography to personalize trauma patient treatment. In *Proceedings of the 17th International Conference on Complexity in Acute Illness*, September 26–27, 2019. **Selected for oral presentation.**
9. George Makrygiorgos, Aaron J. Berliner, Anthony Abel, **Amor Menezes**, Adam Arkin, Douglas S. Clark, and Ali Mesbah. Uncertainty quantification in bio-manufacturing processes for Martian colonization. In *Proceedings of the Ninth International Conference on Mars*, July 22–25, 2019.
8. Aaron J. Berliner, George Makrygiorgos, Mia Mirkovic, **Amor A. Menezes**, Ali Mesbah, and Adam P. Arkin. Towards a biomanufacturing-driven reference mission architecture for long-term human Mars exploration. In *Proceedings of the Ninth International Conference on Mars*, July 22–25, 2019.
7. Soumyajit Sen Gupta<sup>P</sup> and **Amor A. Menezes**. Process modeling and optimization for a space biomanufacturing factory. In *Proceedings of the AIChE Space Travel: Adaptive Research and Technologies from Biological and Chemical Engineering (STAR Tech)*, November 12–14, 2018.
6. **Amor A. Menezes**. Realizing a self-reproducing space factory with engineered and programmed biology. In *Proceedings of the NASA Deep Space Gateway Concept Science Workshop*, February 27–March 1, 2018. **Selected for oral presentation.**
5. Aaron J. Berliner, **Amor A. Menezes**, Eli Groban, Christopher P. McKay, and Adam P. Arkin. Open access characterization of extremophiles for potential application as pioneer organisms in Martian ecopoiesis.

In *Proceedings of Extremophiles 2016, the 11th International Congress on Extremophiles*, September 12–16, 2016.

4. **Amor A. Menezes** and Pierre T. Kabamba. Efficient search and responsiveness trade-offs in a Markov chain model of evolution in dynamic environments. In *Proceedings of the 2015 Gordon Research Conference on Stochastic Physics in Biology*, January 11–16, 2015.
3. **Amor A. Menezes**, John Cumbers, John A. Hogan, and Adam P. Arkin. *In situ* resource utilization on manned Martian missions. In *Proceedings of the 2014 Synthetic Biology: Engineering, Evolution & Design Conference*, July 14–17, 2014. **Selected for oral presentation.**
2. **Amor A. Menezes**, Adam Arkin, and Mitchell Cohen. Modeling coagulation activation in trauma patients. In *Proceedings of the 11th International Conference on Complexity in Acute Illness, Journal of Critical Care*, volume 28, pages e10–e11, September 6–9, 2012. **Selected for oral presentation.**
1. **Amor A. Menezes**, Adam P. Arkin, and Mitchell J. Cohen. A minimal coagulation activation model for thrombin in trauma patients. In *Proceedings of the 13th International Conference on Systems Biology*, page 110, August 19–23, 2012.

### Strategic Action Plans

1. Sanjana J. Ravi and **Amor A. Menezes**. Towards a synthetic biology blueprint for countering biological threats to the United States. *Synthetic Biology Leadership Excellence Accelerator Program (LEAP)*, 2016.

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### NON-REFEREED PUBLICATIONS

#### Theses

1. **Amor A. Menezes**. *Selective Evolutionary Generation Systems: Theory and Applications*. PhD Thesis, University of Michigan, 2010.

#### Journal Editorials

1. **Amor A. Menezes** and Pierre T. Kabamba. Realizing the promise of robotic self-x systems. *Robotica*, 29(1):i–ii, January 2011.

#### Book Chapters

1. **Amor A. Menezes** and Pierre T. Kabamba. Markov chain rational behavior. In Jingshan Li and Pierre T. Kabamba, editors, *Advances in Systems Theory: Control, Communication Networks, Production Systems and Rational Behavior*. Wing Span Press, 2009.

#### Technical Reports

4. Damon E. Ghetmiri<sup>G</sup> and **Amor A. Menezes**. Control of positive systems with an unknown state-dependent power law input delay and input saturation. 2022. arXiv:2212.12095 [math.OC].
3. Chris Vermillion, **Amor Menezes**, and Ilya Kolmanovsky. Stable hierarchical model predictive control using an inner loop reference model and  $\lambda$ -contractive terminal constraint sets — supplementary material. Technical Report CGR-13-01, University of Michigan, Ann Arbor, 2013. arXiv:1305.2651 [math.OC].
2. **Amor Menezes** and Pierre Kabamba. Resilient opportunistic on-line global optimization. Technical Report CGR-09-11, University of Michigan, Ann Arbor, 2009.
1. **Amor Menezes** and Pierre Kabamba. On the seeding of self-reproducing systems. Technical Report CGR-07-08, University of Michigan, Ann Arbor, 2007.

## PATENTS AND COPYRIGHTS

- 2023 University of Florida provisional patent application entitled “Viscoelastic Clot Strength Predictions for Cybermedicine,” Serial No. 63/498,624.
  - 2022, 2023 University of Florida provisional and non-provisional patent applications entitled “Automated Platform to Treat Trauma-Induced Coagulopathy with Personalized Coagulation Factor Concentrations,” Serial Nos. 63/324,323 and 18/190,623, respectively.
  - 2021 University of Florida exerted commercial copyright on the “Goal-Oriented Coagulation Management (GCM) Algorithm” in *npj Systems Biology and Applications*, 7:44, December 7, 2021.
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## PRESS INTERVIEWS AND ARTICLES

### Radio

- 1. Space synbio; space biomanufacturing; astronaut food; and space pharmaceuticals. *Science Today (CBS Radio)*, November 12, 2014.

### Print (Newspapers, Magazines, and Web)

- 19. B-SURE teams ready to blast off! *DARPA News*, May 11, 2023.
  - 18. UF will spearhead DARPA mission to pioneer crucial biomanufacturing in space. *UF Powering the New Engineer*, March 16, 2023.
  - 17. Team led by UF MAE Professor Amor Menezes set to begin momentous space biomanufacturing mission. *UF MAE Highlights*, March 14, 2023.
  - 16. Efficient and resilient biomanufacturing in variable gravity. *Space Station Research Explorer on NASA.gov*, February 20, 2023.
  - 15. Microbes could help us make rocket fuel on Mars. *Popular Science*, November 9, 2021.
  - 14. Deep-space travel, colonization may rely on genetically engineered life forms. *Genetic Literacy Project*, June 16, 2017.
  - 13. Biotechnology, synthetic biology keys to humans colonizing other planets. *Genetic Literacy Project*, January 27, 2016.
  - 12. Science deniers stay home: Synthetic biology crucial to human missions to Mars. *Genetic Literacy Project*, January 5, 2016.
  - 11. How GMOs will let astronauts live on Mars. *Discover Magazine*, December 18, 2015.
  - 10. Why hacking DNA is the secret of deep-space travel. *Popular Mechanics*, December 11, 2015.
  - 9. The many frontiers of synthetic biology. *Berkeley Engineer*, May 1, 2015.
  - 8. To the stars and back again. *Berkeley Science Review*, April 29, 2015.
  - 7. Taking our (bacterial) cultures into space. *Berkeley Science Review*, April 28, 2015.
  - 6. Packing light for Mars. *Cosmos*, March 16, 2015.
  - 5. Mars missions and space synthetic biology. *BioTechniques*, December 5, 2014.
  - 4. Why synthetic biology could be the key to space travel. *Popular Mechanics*, November 7, 2014.
  - 3. Mit Bioreaktoren und 3D-Druckern zum Mars. *Der Spiegel*, November 5, 2014.
  - 2. Biological waste to transform long-duration space travel and colonisation of Mars. *International Business Times*, November 5, 2014.
  - 1. Q & A: Synthetic biology and space. *Royal Society Publishing Blog*, November 5, 2014.
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## INVITED TALKS (EXCLUDING CONFERENCE PAPER PRESENTATIONS)

### Plenaries

1. *Outer Space: The Next Biotech Frontier*. World Congress on Industrial Biotechnology, Biotechnology Innovation Organization, San Diego CA, April 18, 2016.

### Department Seminars and Other Presentations

28. *Controlling Coagulation*. Pulmonary Research Conference Seminar Series, University of Florida, Gainesville FL, February 22, 2023.
27. *Systems Engineering at the Center for the Utilization of Biological Engineering in Space*. SynBioBeta, BetaSpace, San Francisco CA, October 3, 2019.
26. *Biochemical Process Modeling and Optimization for a Space Biomanufacturing Factory*. ACS National Meeting and Exposition, Exploring the Frontiers of Chemistry through NASA Research, Orlando FL, April 2, 2019.
25. *Systems Engineering for a Space Biomanufacturing Factory*. AIChE Space Travel: Adaptive Research and Technologies from Biological and Chemical Engineering (STAR Tech), Houston TX, November 12, 2018.
24. *Engineering Robotic Biological Systems*. J. Crayton Pruitt Family Department of Biomedical Engineering, University of Florida, Gainesville FL, February 19, 2018.
23. *Engineering Robotic Biological Systems*. Department of Agricultural and Biological Engineering, University of Florida, Gainesville FL, December 19, 2017.
22. *Engineering Robotic Biological Systems*. Department of Mechanical Engineering, Virginia Polytechnic Institute and State University, Blacksburg VA, March 22, 2017.
21. *Engineering Robotic Biological Systems*. Department of Mechanical and Aerospace Engineering, University of Florida, Gainesville FL, March 2, 2017.
20. *Engineering Robotic Biological Systems*. Systems Engineering Colloquium, Naval Postgraduate School, Monterey CA, January 19, 2017.
19. *Engineering Robotic Biological Systems*. Intelligent Systems Division, NASA Ames Research Center, Mountain View CA, April 5, 2016.
18. *Engineering Robotic Biological Systems*. Department of Weapons and Systems Engineering, United States Naval Academy, Annapolis MD, March 3, 2016.
17. *Targeted Clinical Control of Trauma Patient Coagulation Through a Thrombin Dynamics Model*. Hot Topics Session, The Path to Predictive Medicine with Computing, Biological Applications of Advanced Strategic Computing Meeting, Monterey CA, September 22, 2015.
16. *LEAP Fellow Report*. Synthetic Biology Engineering Research Center Fall Meeting, Massachusetts Institute of Technology, Cambridge MA, September 20, 2015.
15. *Engineering Robotic Biological Systems*. Department of Mechanical Engineering, Iowa State University, Ames IA, February 19, 2015.
14. *Targeted Clinical Control of Trauma Patient Coagulation Through a Thrombin Dynamics Model*. Postdoc Seminar Series. California Institute for Quantitative Biosciences, University of California, Berkeley CA, February 13, 2015.
13. *Towards Synthetic Biological Approaches to Resource Utilization on Space Missions*. Synthetic Biology Supergroup, California Institute for Quantitative Biosciences – Berkeley; Synthetic Biology Engineering Research Center; and the Synthetic Biology Institute, University of California, Berkeley CA, January 21, 2015.
12. *The Utility of Biological CO<sub>2</sub>-Based Manufacturing on Manned Space Missions*. Weekend Workshop on CO<sub>2</sub>-Based Manufacturing, NASA Ames Research Center, Mountain View CA, June 28, 2014.

11. *A Thrombin Dynamics Model of Trauma Patient Coagulation for Targeted Clinical Control*. Center for Systems & Synthetic Biology, University of California, San Francisco CA, May 24, 2013.
10. *Efficient, Model-Independent and Responsive Stochastic Optimization for Robot Learning*. Mobility and Robotic Systems Section, NASA Jet Propulsion Laboratory, Pasadena CA, July 25, 2012.
9. *Causal Inference in Modeling Coagulation Activation in Trauma*. Causal Consulting Seminar Series. Division of Biostatistics, School of Public Health, University of California, Berkeley CA, April 24, 2012.
8. *Efficient and Responsive Stochastic Optimization*. Control Systems, United Technologies Research Center, East Hartford CT, August 9, 2011.
7. *Efficient and Responsive Stochastic Optimization for Machine Learning*. Machine Learning / Control Systems, Philips Research North America, Briarcliff Manor NY, August 2, 2011.
6. *Efficient and Responsive Biologically-Inspired Stochastic Optimization*. Department of Bioengineering, University of California, Berkeley CA, June 28, 2011.
5. *Efficient and Responsive Systems for Stochastic Optimization*. Department of Electrical Engineering, University of Washington, Seattle WA, February 11, 2011.
4. *Efficient and Responsive Behavior Design by Selective Evolutionary Generation*. Control Seminar Series. College of Engineering, University of Michigan, Ann Arbor MI, September 24, 2010.
3. *Evolutionary Generation Systems Theory for Resilient Opportunistic Global On-line Optimization*. Flight Dynamics and Control Seminar Series. Department of Aerospace Engineering, University of Michigan, Ann Arbor MI, March 27, 2009.
2. *Aerospace Exploration: The Final Frontier for the Next Generation*. Soaring Success for High Achievers. Washtenaw County Alliance for Gifted Education, Malletts Creek Library, Ann Arbor MI, March 27, 2007.
1. *Information Requirements for Self-Reproducing Systems in Lunar Robotic Colonies*. Flight Dynamics and Control Seminar Series. Department of Aerospace Engineering, University of Michigan, Ann Arbor MI, November 3, 2006.

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## TRAINEES

### Postdoctoral Associates

2018 – 2021 Soumyajit Sen Gupta, Ph.D. from Indian Institute of Technology, Bombay, 2017  
Now: Assistant Professor, Indian Institute of Technology (Indian School of Mines), Dhanbad

### Doctoral and Pre-doctoral Students

2023 – Guanyun Liu, University of Florida Department of Mechanical and Aerospace Engineering  
Ph.D. expected in 2027.

2022 – Angela Lalovic, University of Florida Department of Mechanical and Aerospace Engineering  
**Selected for College of Engineering Dean's Research Award while a trainee.**  
Ph.D. expected in 2026.

2022 – Hannah I. Roberts, University of Florida Genetics Institute  
**Selected as an NSF Graduate Research Fellow while a trainee.**  
Ph.D. expected in 2026.

2020 – Anya Volter, University of Florida J. Crayton Pruitt Family Department of Biomedical Engineering  
**Selected as a NASA Space Technology Graduate Research Fellow while a trainee.**  
Ph.D. expected in 2025.

- 2020 – Jithran Ekanayake, University of Florida Department of Agricultural and Biological Engineering  
**Recognized while a trainee as the first Sri Lankan to have their science experiments conducted aboard the International Space Station.**  
 Ph.D. expected in 2025.
- 2020 – Amanda E. Shick, University of Florida Department of Mechanical and Aerospace Engineering  
 Candidacy: February 15, 2023  
 Ph.D. expected in 2025.
- 2017 – 2021 Damon E. Ghetmiri, University of Florida Department of Mechanical and Aerospace Engineering  
 Candidacy: December 18, 2020  
 Defended: November 2, 2021  
 Now: Senior Source Performance Engineer - EUV Technology, ASML

### **Masters Students**

- 2021 – 2022 Nathan G. Smith, University of Florida Department of Mechanical and Aerospace Engineering  
 Now: Graduate Student, University of Florida
- 2020 – 2022 Robert B. Martinez, University of Florida Department of Mechanical and Aerospace Engineering
- 2019 – 2020 Alexander J. Kametz, University of Florida Department of Mechanical and Aerospace Engineering  
 Now: Controls Engineer, John Deere
- 2018 – 2019 Tejassvittaa Sahu, University of Florida J. Crayton Pruitt Family Department of Biomedical Engineering  
 Now: Senior Research Assistant, Baylor College of Medicine
- 2011 Dhaval D. Shah, University of Michigan Department of Aerospace Engineering  
 Now: Technical Program Manager, Amazon Web Services

### **Undergraduate Students with Theses**

- 2022 – 2023 Matthew D. Chertok, University of Florida Department of Chemical Engineering  
 Thesis: A New Plasmid to Estimate Intracellular Annexin V Content for Intelligent Biomanufacturing  
 Defended: April 12, 2023  
 Now: Graduate Student, Princeton University
- 2020 – 2021 Angela Lalovic, University of Florida Department of Mechanical and Aerospace Engineering  
 Thesis: Modeling to Enable Neural Network Control for Space Life Support  
 Defended: December 10, 2021  
 Now: Graduate Student, University of Florida
- 2019 – 2020 Saige R. Dreckler, University of Florida Department of Mechanical and Aerospace Engineering  
 Thesis: Effects of Space Biomanufacturing on Fuel Production Alternatives for Mars Exploration  
 Defended: April 22, 2020  
 Now: Water Recovery Research and Development Engineer, Axiom Space

### **Theses and Oral Exam Committees**

- 2023 Ph.D. candidacy: Wenting Wang (University of Florida, Department of Mechanical and Aerospace Engineering, Exam: July 26, 2023)  
 Ph.D. candidacy: Nathan L. O'Neil (University of Florida, Department of Agricultural and Biological Engineering, Exam: March 27, 2023)  
 Ph.D.: Omkar S. Patil (University of Florida, Department of Mechanical and Aerospace Engineering, Defended: March 6, 2023)
- 2022 Ph.D. candidacy: Emily J. Griffis (University of Florida, Department of Mechanical and Aerospace Engineering, Exam: November 29, 2022)

- Ph.D.: Brittanny V. Holden (University of Florida, Department of Mechanical and Aerospace Engineering, Defended: August 15, 2022)
- Ph.D. candidacy: Hoda Akl (University of Florida Department of Physics, Exam: June 28, 2022)
- Ph.D.: Chase P. Kelley (University of Florida Genetics Institute, Defended: June 27, 2022)
- Ph.D. candidacy: Brittanny V. Holden (University of Florida, Department of Mechanical and Aerospace Engineering, Exam: April 21, 2022)
- Ph.D.: J. Tyler Smith (University of Florida Department of Mathematics, Defended: March 22, 2022)
- Ph.D. candidacy: Sage C. Edwards (University of Florida, Department of Mechanical and Aerospace Engineering, Exam: March 15, 2022)
- Ph.D. candidacy: Omkar S. Patil (University of Florida, Department of Mechanical and Aerospace Engineering, Exam: February 25, 2022)
- 2021 Ph.D. candidacy: Kimberly J. Stubbs (University of Florida, Department of Mechanical and Aerospace Engineering, Exam: November 3, 2021)
- Ph.D.: Yanlin Zhou (University of Florida, Department of Electrical and Computer Engineering, Defended: October 28, 2021)
- Ph.D.: Federico M. Zegers (University of Florida, Department of Mechanical and Aerospace Engineering, Defended: July 7, 2021)
- Ph.D.: James Bevington (University of New South Wales, School of Civil and Environmental Engineering, Examined: May 15, 2021)
- Ph.D.: Brendon C. Allen (University of Florida, Department of Mechanical and Aerospace Engineering, Defended: March 17, 2021)
- Ph.D. candidacy: Yanlin Zhou (University of Florida, Department of Electrical and Computer Engineering, Exam: March 22, 2021)
- 2020 Ph.D. candidacy: Brendon C. Allen (University of Florida, Department of Mechanical and Aerospace Engineering, Exam: October 6, 2020)
- Ph.D. candidacy: Chase P. Kelley (University of Florida Genetics Institute, Exam: August 11, 2020)
- Ph.D. candidacy: J. Tyler Smith (University of Florida Department of Mathematics, Exam: April 15, 2020)
- 2019 Ph.D. candidacy: Federico M. Zegers (University of Florida Department of Mechanical and Aerospace Engineering, Exam: May 31, 2019)
- Undergraduate: Brianna M. Smith (University of Florida Department of Chemical Engineering, Defended: December 9, 2019)
- Undergraduate: Shan He (University of Florida Department of Mechanical and Aerospace Engineering, Defended: December 3, 2019)
- Undergraduate: Michael Woc (University of Florida Department of Mechanical and Aerospace Engineering, Defended: April 19, 2019)
- 2018 Undergraduate: Max Cohen (University of Florida Department of Mechanical and Aerospace Engineering, Defended: December 3, 2018)
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## COURSE INSTRUCTION AND DEVELOPMENT

### Graduate

- 2020 **EML 6934 Modeling and Control of Biomolecular Machines (new course developed in 2020)**  
*University of Florida*  
Overview of biomolecular systems engineering. Introduction to cell processes, biochemical kinetics, models of biological macromolecules, analyses of biomolecular dynamics, simulation of stochastic behaviors, common gene regulatory network motifs, and the design of synthetic biology circuits.  
S2020: 10 students  
Mean Instructor Rating: 4.69/5.00
- 2011 **AE 551/EECS 562 Nonlinear Systems and Control (co-taught)**  
*University of Michigan*  
Introduction to the analysis and design of nonlinear systems and nonlinear control systems. Stability analysis using Lyapunov, input-output, and asymptotic methods. Design of stabilizing controllers using: linearization, absolute stability theory, vibrational control, sliding modes, and feedback linearization.  
W2011: 40 students

### Undergraduate

- 2018 – 2023 **EAS 2011 Introduction to Aerospace Engineering (course updated in 2018 to increase rigor)**  
*University of Florida*  
Overview of aerospace engineering. Standard atmosphere, basic aerodynamics, airplane performance, stability and control, propulsion, and space flight.  
S2023: 63 students; S2022: 63 students; S2021: 71 students; F2020: 123 students; F2019: 108 students; S2019: 50 students; F2018: 123 students  
Recent Mean Instructor Ratings: S2023: 4.40/5.00; S2022: 4.36/5.00; S2021: 4.71/5.00
- 2018 – 2022 **EML 4312 Control of Mechanical Engineering Systems**  
*University of Florida*  
Theory, analysis and design of control systems, including mechanical, electromechanical, hydraulic, pneumatic and thermal components and systems.  
F2022: 26 students; F2021: 48 students; S2018: 108 students  
Recent Mean Instructor Ratings: F2022: 4.63/5.00; F2021: 4.63/5.00; S2018: 4.57/5.00

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## PROFESSIONAL SERVICE

### Editorial

- 2020 – 2023 Associate Editor, IEEE Control Systems Society Technology Conference Editorial Board
- 2011 *Robotica*, Guest Editor, Special Issue on “Robotic Self-X Systems”

### Reviewer

- 2020, 2023 NSF Proposal Review Panelist for the Dynamics, Control and Systems Diagnostics (DCSD) Program
- 2022 Field-Specific Expert Reviewer for New York University Abu Dhabi Institute
- 2018 2019 South Carolina NASA EPSCoR Research \$750k Program
- Journal (Alphabetical) Advanced Control for Applications, Annals of Biomedical Engineering, Artificial Life, Automatica, Communications Medicine, Computational and Mathematical Methods in Medicine, IEEE/ASME Transactions on Mechatronics, IEEE Transactions on Control Systems Technology, Journal of Mathematical Biology, Journal of the Royal Society Interface, Mathematical Problems in Engineering, Nature Communications, PLoS Computational Biology, PLoS One, Robotica

Conference American Control Conference, ASGSR Annual Meeting, ASME Dynamic Systems and Control Conference,  
(Alphabetical) IEEE Conference on Decision and Control, IFAC World Congress

### **Leadership in Professional and Society Conferences**

2018 – 2019 2019 American Control Conference, Committee Member, Best Student Paper Award  
2016 White House Office of Science and Technology Policy, Technical Expert Discussion Leader in Space Bioengineering, “Homesteading in Space”  
2015 – 2016 NIST, *Synthetic Biology Standards Consortium*, Steering Committee Member, and also Co-lead for the Working Group “Performance Metrics for Engineered Organisms”  
2012 2012 American Control Conference, Session Co-chair, “Flight Control II”  
2011 2011 American Control Conference, Session Co-chair, “Biologically-Inspired Methods and Applications”  
2008 Dynamic Systems and Control Conference, Organizer, Invited Session on “Self-Reconfigurable and Self-Reproducing Dynamic Systems”

### **Invited Workshop Contributor**

2016 Twentieth Century Fox *The Martian*, “Forum on the Journey to Mars 101”; and White House Office of Science and Technology Policy, “Homesteading in Space”  
2016 National Intelligence Council Strategic Futures Group, “Global Trends Report UC Berkeley Workshop”  
2015 NASA Office of the Chief Technologist, “BioSpace Big Think”  
2015 DARPA BTO, “Workshop on Biocomplexity”  
2014 NASA Ames Research Center, “Weekend Workshop on CO<sub>2</sub>-Based Manufacturing”

### **Society and Technical Committee Memberships**

Member of AIAA, ASGSR, and ASME

Senior Member of IEEE

Control Systems Society

Technical Committees: Aerospace Controls; Healthcare and Medical Systems; Intelligent Control;

Nonlinear Systems and Control; Systems and Synthetic Biology

Engineering in Medicine and Biology Society

Robotics and Automation Society

Systems, Man, and Cybernetics Society

### **University**

2023 – University of Florida Department of Mechanical and Aerospace Engineering, Member, Faculty Search Committee, Autonomy Search Subcommittee  
2023 – University of Florida Department of Mechanical and Aerospace Engineering, Member, Seminar Committee  
2023 – University of Florida Department of Mechanical and Aerospace Engineering, Trainer, Bloodborne Pathogen Program  
2023 – University of Florida, Faculty Mentor, Wertheim Engineers’ Biotechnology Organization (WEBiO)  
2019 – University of Florida Department of Mechanical and Aerospace Engineering, Member, Graduate Recruitment Admissions Committee  
2019 – 2022 University of Florida Synthetic Biology Working Group, Member, Biofoundry Exploration Subcommittee

2020, 2021	University of Florida, Faculty Mentor, Growing Beyond Earth (NASA/Fairchild Tropical Botanic Garden) undergraduate competition team, which was “National Collegiate Winner” in 2021 and “National Collegiate Finalist” in 2020.
2018 – 2020	University of Florida, Faculty Mentor, International Genetically Engineered Machine (IGEM) undergraduate competition team
2018, 2019	University of Florida Herbert Wertheim College of Engineering, Marshal, Spring Commencement / Recognition Ceremony
2011	University of Michigan College of Engineering, Member, Outstanding Student Instruction Award Selection Committee
2009 – 2010	University of Michigan Department of Aerospace Engineering, Executive Member, Graduate Student Advisory Council
2008 – 2009	University of Michigan Department of Aerospace Engineering, Organizer, Flight Dynamics and Control Seminar Series
2008, 2009	University of Michigan Department of Aerospace Engineering, Organizer, Graduate Student Instructor Orientation

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