Andras Gyorgy

Curriculum Vitæ

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Positions

2020 – **Assistant Professor**, *Bioengineering*, New York University Abu Dhabi, Abu Dhabi, UAE

2019 – **Global Network Assistant Professor**, *Biomedical Engineering*, New York University Tandon, New York, NY, USA

2017 – **Assistant Professor**, *Electrical Engineering*, New York University Abu Dhabi, Abu Dhabi, UAE

2017 – **Global Network Assistant Professor**, *Electrical Engineering*, New York University Tandon, New York, NY, USA

2016 – 17 **Postdoctoral Scholar**, *Electrical Engineering and Computer Sciences*, University of California, Berkeley, Berkeley, CA, USA

Education

2016 **PhD in Electrical Engineering**, *Massachusetts Institute of Technology*, Cambridge, MA, USA

2011 **MS in Biomedical Engineering**, *Budapest University of Technology and Economics*, Budapest, Hungary

2009 **MS in Electrical Engineering**, *Budapest University of Technology and Economics*, Budapest, Hungary

Publications

Members of my lab are indicated as: research technician[¶], undergraduate student[⋆], graduate student[†], postdoctoral scholar[♯].

Papers under review

X. Li[♯], **A. Gyorgy**. Tuning evolvability via plasmid copy number and regulatory architecture, *Nature Communications*

C. Yong[†], A.F.C. Rincón[♯], S.H-N. Joshi[¶], R. Memon[⋆], **A. Gyorgy**. Plasmid copy number control offers a versatile tool in synthetic biology applications, *Molecular Systems Biology*

A.F.C. Rincón[♯], A.J. Cabral, **A. Gyorgy**, N. Farny. A portable and dual-inducible control system for multistep biosynthetic pathways in Gram-negative bacteria, *Metabolic Engineering*

C. Yong[†], Y. Zhou[†], **A. Gyorgy**. The impact of plasmid copy number on leaky gene expression and on the behavior of an activator-based genetic switch, *IEEE Conference on Decision and Control (invited paper)*, Milan, Italy

Journal papers

2023 **A. Gyorgy**. Competition and evolutionary selection among core regulatory motifs in gene expression control, *Nature Communications*, 14:8266

A. Gyorgy, A. Menezes, M. Arcak. A blueprint for a synthetic genetic feedback optimizer, *Nature Communications*, 14:2554 (covered by Genetic Engineering & Biotechnology News)

A. Gyorgy, T. Marlow, B. Abrahao, K. Makovi. Segregated mobility patterns amplify neighborhood disparities in the spread of COVID-19, *Network Science*, 11(3):411-430

H. Ibrahim, F. Liu, ... , **A. Gyorgy**, ..., T. Rahwan, Y. Zaki. Perception, performance, and detectability of conversational artificial intelligence across 32 university courses, *Scientific Reports*, 13:12187

2022 S.H-N. Joshi[¶], C. Yong[†], **A. Gyorgy**. Inducible plasmid copy number control for synthetic biology in commonly used *E. coli* strains, *Nature Communications*, 13:6691

2021 **A. Gyorgy**. Context-dependent stability and robustness of genetic toggle switches with leaky promoters, *Life*, 11(11):150

C. Yong†, **A. Gyorgy**. Stability and robustness of unbalanced genetic toggle switches in the presence of scarce resources, *Life*, 11(4):271

A. Gyorgy. Self-activation attenuates the adverse effects of scarce resources on genetic switches, *IEEE Control Systems Letters*, 5(2):611–616

2019 **A. Gyorgy**. Sharing resources can lead to monostability in a network of bistable toggle switches, *IEEE Control Systems Letters*, 3(2):8467997

2017 **A. Gyorgy**, M. Arcak. Pattern formation over multigraphs, *IEEE Transactions on Network Science and Engineering*. 5(1):55–64

2016 J.W. Lee, **A. Gyorgy**, D.E. Cameron, N. Pyenson, K.R. Choi, J.C. Way, P.A. Silver, D. Del Vecchio, J.J. Collins. Creating single-copy genetic circuits, *Molecular Cell*, 63(2):329–336

2015 **A. Gyorgy**, J.I. Jimenez, J. Yazbek, H. Chung, R. Weiss, D. Del Vecchio. Isocost lines describe the cellular economy of genetic circuits, *Biophysical Journal*, 109(3):639–646

2014 **A. Gyorgy**, D. Del Vecchio. Modular composition of gene transcription networks, *PLoS Computational Biology*, 10(3):e1003486

2011 **A. Gyorgy**, L. Kovacs, P. Szalay, D.A. Drexler, B. Benyo, Z. Benyo. Quasi-model-based control of type 1 diabetes mellitus, *Journal of Electrical & Computer Engineering*, 4

L. Kovacs, B. Kulcsar, **A. Gyorgy**, Z. Benyo. Robust servo control of a novel type 1 diabetic model, *Optimal Control Application and Methods*, 32(2):215–238

Peer-reviewed conference papers

2021 **A. Gyorgy**. Self-activation attenuates the adverse effects of scarce resources on genetic switches, *IEEE Conference on Decision and Control (joint L-CSS submission)*, remote

2020 **A. Gyorgy**, A. Menezes, M. Arcak. Genetic optimizer module for synthetic biology, *IFAC World Congress*, remote

A. Gyorgy. Scarcity of cellular resources decreases the robustness of toggle switches to noise, *IFAC American Control Conference*, remote

2019 **A. Gyorgy**. How cell-to-cell heterogeneity and scarce resources shape the population-level stability profile of toggle switches, *IEEE Conference on Decision and Control*, Nice, France

A. Gyorgy. Leveraging resource competition for part characterization in cell-free extracts, *IFAC Conference on Foundations of Systems Biology in Engineering (invited paper)*, Valencia, Spain

A. Gyorgy. Bistability requires better balanced toggle switches in the presence of competition for shared cellular resources, *IFAC American Control Conference*, Philadelphia, PA, USA

2018 W. Halter, F. Allgower, R.M. Murray, **A. Gyorgy**. Optimal experiment design and leveraging competition for shared resources in cell-free extracts, *IEEE Conference on Decision and Control*, Miami Beach, FL, USA

2017 **A. Gyorgy**, M. Arcak. Pattern formation over graphs with asymmetric connections, *IFAC World Congress*, Toulouse France

2016 **A. Gyorgy**, R.M. Murray. Quantifying resource competition and its effects in the TX-TL system, *IEEE Conference on Decision and Control*, Las Vegas, NV, USA

2015 T.P. Prescott, **A. Gyorgy**. Bounding the effect of retroactivity in the presence of parameter uncertainty, *IEEE American Control Conference*, Chicago, IL, USA

2014 **A. Gyorgy**, D. Del Vecchio. Limitations and trade-offs in gene expression due to competition for shared cellular resources, *IEEE Conference on Decision and Control (invited paper)*, Los Angeles, CA, USA

2013 **A. Gyorgy**, D. Del Vecchio. How slaves affect a master module in gene transcription networks, *IEEE Conference on Decision and Control (invited paper)*, Florence, Italy

2012 **A. Gyorgy**, D. Del Vecchio. Retroactivity to the input in complex gene transcription networks, *IEEE Conference on Decision and Control (invited paper)*, Maui, HI, USA

2011 L. Kovacs, **A. Gyorgy**, P. Szalay, D.A. Drexler, B. Benyo, Z. Benyo. Quasi model based optimal control of type 1 diabetes mellitus, *IFAC World Congress*, Milan, Italy

2010 **A. Gyorgy**, P. Szalay, Z. Benyo, B. Benyo, A. Kovacs, L. Kovacs. ANFIS regulated type 1 diabetic model for different glucose absorption scenarios, *IEEE Conference on Intelligent Engineering Systems*, Las Palmas, Spain

L. Kovacs, **A. Gyorgy**, B. Kulcsar, P. Szalay, B. Benyo, Z. Benyo. Robust control of type 1 diabetes using μ-synthesis, *UKACC Conference on Control*, Coventry, UK

L. Kovacs, **A. Gyorgy**, P. Szalay, B. Benyo, Z. Benyo, C.E. Hann, J.G. Chase. Investigating the applicability of qALPV modeling to ICU models for glycaemic control, *UKACC Conference on Control*, Coventry, UK

2009 **A. Gyorgy**, I. Harmati. Motion planning algorithms for tactical actions in robot soccer, *IEEE European Control Conference*, Budapest, Hungary

L. Kovacs, **A. Gyorgy**, Zs. Almassy, Z. Benyo. Analyzing a novel model of human blood glucose system at molecular levels, *IEEE European Control Conference*, Budapest, Hungary

L. Kovacs, **A. Gyorgy**, B. Benyo. Type 1 diabetes regulated by ANFIS at molecular levels, *World Congress on Medical Physics and Biomedical Engineering*, Munich, Germany

L. Kovacs, **A. Gyorgy**, B. Benyo, Z. Benyo, A. Kovacs. Soft computing control of Type 1 diabetes described at molecular levels, *International Symposium on Applied Computational Intelligence and Informatics*, Timisoara, Romania

A. Gyorgy, T. Barbarics, Zs. Puspoki, J. Padanyi. Application of neural networks in mine detection, *International Conference on Climbing and Walking Robots and the Support Technologies for Mobile Machines*, Istanbul, Turkey

Book chapters

2021 **A. Gyorgy**. A practical step-by-step guide for quantifying retroactivity in gene networks, *Design, Construction and Modelling of Synthetic Gene Circuits*, Humana, New York, NY

Conference abstracts

2024 C. Yong[†], A.F.C. Rincón[♯], S.H-N. Joshi[¶], R. Memon[⋆], **A. Gyorgy**. Plasmid copy number control represents a versatile tool in synthetic biology applications, *Synthetic Biology: Engineering, Evolution & Design*, Atlanta, GA, USA

2023 S.H-N. Joshi[¶], C. Yong[†], **A. Gyorgy**. Inducible plasmid copy number control for synthetic biology in commonly used *E. coli* strains, *Gordon Research Conferences*, Newry, ME, USA

S.H-N. Joshi[¶], C. Yong[†], **A. Gyorgy**. Inducible plasmid copy number control for synthetic biology in commonly used *E. coli* strains, *Synthetic Biology: Engineering, Evolution & Design*, Los Angeles, CA, USA

A. Gyorgy. Competition and evolutionary selection among core regulatory motifs in gene expression control, *Synthetic Biology UK*, Bristol, UK

S.H-N. Joshi[¶], C. Yong[†], **A. Gyorgy**. A plasmid with inducible copy number control for the modular construction and rapid prototyping of complex synthetic gene circuits, *Synthetic Biology UK*, Bristol, UK

2020 **A. Gyorgy**. Competition for shared cellular resources decreases the robustness of toggle switches by pushing them towards monostability, *NYU Biomedical and Biosystems Conference*, Abu Dhabi, UAE

2019 **A. Gyorgy**. How resource competition shapes the stability profile of toggle switches at the cellular and at the population levels, *Synthetic Biology: Engineering, Evolution & Design*, New York, NY, USA

A. Gyorgy. Competition for shared cellular resources decreases the robustness of toggle switches by pushing them towards monostability, *Synthetic Biology UK*, Warwick, UK

2018 **A. Gyorgy**. Extracting information in cell-free systems leveraging competition for shared resources, *Synthetic Biology: Engineering, Evolution & Design*, Phoenix, AZ, USA

A. Gyorgy. Shared resources by the numbers, *Center for Genomics and Systems Biology Conference*, Abu Dhabi, UAE

A. Gyorgy. Shared resources by the numbers, *NYU Biomedical and Biosystems Conference*, New York, NY, USA

A. Gyorgy. Optimal part characterization with shared cellular resources, *International Conference on Systems Biology*, Lyon, France

A. Gyorgy. Shared resources and optimal experiments in cell-free extracts, *Winter Q-Bio Meeting*, Wailea, HI, USA

2015 **A. Gyorgy**, D. Del Vecchio. Simplexes characterize the coupling in gene expression due to competition for RNAP and ribosomes, *Synthetic Biology: Engineering, Evolution & Design*, Boston, MA, USA

2014 **A. Gyorgy**, J.I. Jimenez, D. Del Vecchio. Dynamics of complex gene transcription networks: from single modules to multi-module systems, *Winter Q-Bio Meeting*, Wailea, HI, USA

A. Gyorgy, J.I. Jimenez, D. Del Vecchio. Dynamics of complex gene transcription networks: from single modules to multi-module systems, *International Conference on Systems Biology*, Melbourne, Australia

2013 **A. Gyorgy**, D. Del Vecchio. Modular composition of gene transcription networks, *International Conference on Systems Biology*, Copenhagen, Denmark

Workshops

2023 **BIRS Emerging Mathematical Challenges in Synthetic Biological Network Design**
Banff, Canada

2021 **NSF Systems and Control Theory for Synthetic Biology Workshop**
Alexandria, VA, USA

2019 **Seventh Arab-American Frontiers Symposium**
Cairo, Egypt

2017 **NSF Multidisciplinary Complex Systems Workshop**
Arlington, VA, USA

International Workshop on Control Engineering and Synthetic Biology
London, UK

2014 **International Workshop on Biodesign Automation**
Boston, MA, USA

Synthetic Biology Boston Workshop
Boston, MA, USA

Invited talks

2023 **Synthetic Biology Young Speaker Series**
remote

Boston University
hosted by Marie Dunlop and Ahmad Khalil, Boston, MA, USA

University of California, Berkeley
hosted by Murat Arcak, Berkeley, CA, USA

University of California, Santa Cruz
hosted by Marcella Gomez, Santa Cruz, CA, USA

University of California, Santa Barbara
hosted by Enoch Yeung, Santa Barbara, CA, USA

University of California, Los Angeles
hosted by Elisa Franco, Los Angeles, CA, USA

California Institute of Technology
hosted by Richard M. Murray, Pasadena, CA, USA

Stanford University
hosted by Michaëlle N. Mayalu, Stanford, CA, USA

Massachusetts Institute of Technology
hosted by Domitilla Del Vecchio, Cambridge, MA, USA

ETH Zurich
hosted by Mustafa H. Khammash, Basel, Switzerland

University of Oxford
hosted by Antonis Papachristodoulou and Harrison Steel, Oxford, UK

Imperial College London
hosted by Jose I. Jimenez and Guy-Bart Stan, London, UK

University of Edinburgh
hosted by Filippo Menolascina and Diego Oyarzún, Edinburgh, UK

2018 **University of Edinburgh**
hosted by Filippo Menolascina, Edinburgh, UK

California Institute of Technology
hosted by Richard M. Murray, Pasadena, CA, USA

Massachusetts Institute of Technology
hosted by Domitilla Del Vecchio, Cambridge, MA, USA

University of Warwick
hosted by Declan Bates, Warwick, UK

University of Bristol
hosted by Thomas Gorochowski and Mario di Bernardo, Bristol, UK

Imperial College London
hosted by Guy-Bart Stan, London, UK

University of Delaware
hosted by Abhyudai Singh, Newark, DE, USA

2017 **University of Warwick**
hosted by Declan Bates, Warwick, UK

University of Edinburgh
hosted by Filippo Menolascina, Edinburgh, UK

University of Surrey
hosted by Jose I. Jimenez, Surrey, UK

University of Bristol
hosted by Thomas Gorochowski and Lucia Marucci, Bristol, UK

Imperial College London
hosted by Guy-Bart Stan and Diego Oyarzún, London, UK

Grants

2021 – 24 **Sandooq Al Watan Applied Research & Development (PI)**
Engineering mechanical properties of biogenic concrete (co-PI: Kemal Celik)
Sandooq Al Watan, $136k over 36 months

2019 – 20 **Research Enhancement Fund (PI)**
Rational genetic control of urease activity for sustainable concrete production (co-PI: Kemal Celik)
NYU Abu Dhabi, $40k over 12 months

2018 **Student Learning Outcomes Assessment (PI)**
Course development: Synthetic Biology for Engineers
NYU Abu Dhabi, $2k over 12 months

Teaching

2019 – **Circuits Fundamentals**, *Instructor*, NYU Abu Dhabi

Instructor rating:	4.8, 5.0, 4.7, 4.8, 4.8, 4.9, 4.8, 4.7, 4.8, 4.9	Mean: 4.8
Course rating:	4.8, 4.7, 4.5, 4.6, 4.8, 4.6, 4.8, 4.7, 4.7, 4.9	Mean: 4.7
Enrollment:	18, 22, 17, 26, 27, 24, 30, 30, 29, 30	Mean: 25
Response rate:	33%, 68%, 59%, 54%, 44%, 33%, 67%, 77%, 79%, 90%	Mean: 60%

2018 – **Quantitative Synthetic Biology**, *Course developer & Instructor*, NYU Abu Dhabi

Instructor rating:	4.8, 5.0, 4.7, 5.0, 4.8	Mean: 4.9
Course rating:	4.6, 5.0, 4.3, 4.5, 4.8	Mean: 4.6
Enrollment:	9, 2, 15, 16, 16	Mean: 12
Response rate:	56%, 50%, 67%, 88%, 81%	Mean: 68%

2013 **Introduction to Numerical Simulation**, *Teaching assistant*, MIT

Mentoring

Undergraduate at NYU Abu Dhabi

Pre-major mentee[†], major mentee[‡], Capstone student[¶], research assistant[⋆], received letter for graduate school, internship, or job application[♯]. For a complete list including students who have not yet graduated, see Appendix B.

Class of 2024	Eros Kuikel[‡⋆♯]	KAUST
	Bayan Assali[†]	NYUAD PPTP
	Ahmad Fraij[♯]	ETH Zurich
	Salim El Hadiri[‡]	
	Omar El Herraoui[♯]	MBZUAI
	Malak Mansour[‡⋆♯]	MBZUAI
	Kirubel Solomon Tesfaye[⋆]	
	Lukelo Thadei Luoga[⋆]	NYUAD Center for Cybersecurity
	Minh Quan Ngoc Nham[⋆]	Erasmus+ program
Class of 2023	Fadhel Barakat[¶]	AECOM Bahrain
	Saideep Sreekumar[¶]	NYUAD Center for Cybersecurity
	Rameen Mahmoud[⋆♯]	NYU Tandon
	Obed Morrison Atsu[‡]	
	Abhay Menon[‡]	NYU Abu Dhabi
Class of 2022	Heorhii Skovorodnikov[⋆♯]	NYU Abu Dhabi EMARATSEC
	Panagiotis Oikonomou[†‡]	NYU
	Hamza Ansari[⋆♯]	KPMG
	Shaheer Haider[†]	RePlaste
	Eddie Seung Hun Han[⋆]	Eriscsson
	Joseph Kevin Kuriakose[⋆]	University of Toronto
	Jacob Chouljian[⋆]	TMT Strategy Consulting
	Paula Navalon[⋆]	Ziina
	Martin Stewart[†]	TDM Middle East
	Dinidu Thewarathanthri[†]	Twinery
Class of 2021	Farida Shaban[¶♯]	Erasmus Mundus Scholar
	Mohammed Oumer[¶⋆♯]	University of Colorado, Boulder
	Yeojin Jung[¶⋆♯]	Carnegie Mellon University
	Mariam Elgamal[¶♯]	Harvard University
	Rumail Memon[‡¶⋆♯]	NYU Abu Dhabi
	Ahmad Nasralla[‡¶⋆♯]	ETH Zurich
	Cristian Garcia[‡¶⋆♯]	noon
	Sungmin Sohn[¶]	UC Berkeley
	Anel Orazgaliyeva[¶]	Amazon
	Raushan Khullar[⋆♯]	UC Berkeley
	Umang Mishra[⋆♯]	IST Austria
	Salama AlZaabi[⋆♯]	G42
Class of 2020	Keziah Ann Johnson[¶♯]	ETH Zurich
	Alia Albastaki[¶]	Boston Consulting Group
	Antony Tahan[‡⋆♯]	Cornell University
	Kai-Wen Yang[‡♯]	Johns Hopkins University
	Doovaraha Maheswarasaarma[♯]	Erasmus Mundus
	Munib Mesinovic[♯]	Rhodes Scholarship
	Noor Alameri[♯]	McKinsey & Company
	Ahmad Baleegh[‡]	NYU
Class of 2019	Bence Almasi[¶♯]	University of Southampton
	Ushna Usman[¶]	Apple
	Amal Mohamed Badri[¶]	Penn State University
	Veronica Lee[¶]	Nature Inc. Tokyo
	Erna Kapetancic[♯]	University of Manchester

iGEM, *co-PI and faculty advisor*, NYU Abu Dhabi
2023 | Silver Medal
2022 | Gold Medal
2021 | Bronze Medal
2020 | Gold Medal & Best Diagnostic Project Nomination
2019 | Silver Medal

Graduate at NYU Abu Dhabi

2024 – **Hanming Li**, *PhD student in Biomedical Engineering*
Thesis advisor

2023 – **Yiren Zhou**, *PhD student in Biomedical Engineering*
Thesis advisor

2020 – **Nuha Salem**, *PhD student in Biology*
Thesis advisor with Kourosh Salehi-Ashtiani

2020 – 24 **Chentao Yong**, *PhD student in Chemical and Biomolecular Engineering*
Thesis advisor

Post-graduate at NYU Abu Dhabi

2023 – **Andrés Felipe Carrillo Rincón**, *Postdoctoral researcher*
Research supervisor

2021 – **Ximing Li**, *Postdoctoral researcher*
Research supervisor

2020 – 21 **Shivang Hina-Nilesh Joshi**, *Research technician, subsequently joined the PhD program at the University of Bristol*
Research supervisor

2019 – 22 **Mireia Garriga-Canut**, *Postdoctoral researcher, subsequently joined the European Molecular Biology Laboratory*
Research supervisor

2018 – 20 **Spencer Smith**, *Research technician, subsequently joined the PhD program at the University of Maryland*
Research supervisor

Awards

2023 **Teaching Award**
Division of Engineering, New York University Abu Dhabi

2019 **Roberto Tempo Best CDC Paper Award Nomination**, *Optimal experiment design and leveraging competition for shared resources in cell-free extracts*
IEEE Conference on Decision and Control

2019 **Mohammed Bin Rashid Centre for Leadership Development's Impactful Leaders Program**, *Created biogenic concrete sample with K. Celik for the startup 4MATION, the only team selected to present their project to His Highness Sheikh Mohammed Bin Rashid Al Maktoum*

Service

Service to the Engineering Division at NYU Abu Dhabi

2020 – **Graduate Committee**, *Member: NYU Abu Dhabi liaison*, NYU Tandon School of Engineering, Department of Biomedical Engineering

2020 – **Engineering Graduate Committee**, *Member: Bioengineering liaison*, NYU Abu Dhabi

2018 – 19 **Bioengineering major accreditation**, *Lead*, NYU Abu Dhabi
Prepared proposal for CAA and ADEK accreditation (approximately 100 pages each)

2018 – 19 **Employer of Choice Advisory Committee**, *Member*, NYU Abu Dhabi

2018 – **Candidate Weekend**, *Interviewer & Program representative for Electrical Engineering & Bionengineering*, NYU Abu Dhabi

2017 – 18 **Graduate Committee Task Force**, *Member*, NYU Abu Dhabi

Service to NYU Abu Dhabi

2020 **Research Conference Program Committee**, *Member*, NYU Abu Dhabi Research Institute

2019 – 22 **University Senate**, *Member*, Tenured/Tenure Track Faculty Senators Council
One of two representatives from NYU Abu Dhabi attending bi-weekly meetings, member of: Global Network University Committee; Administration and Technology Committee; Ad Hoc Committee on Sexual Misconduct; Educational Policies and Faculty/Student Relations

2018 – 19 **Science and Engineering Curriculum Committee**, *Member*

Professional service

Organizer, *Banff International Research Station Workshop: Emerging Mathematical Challenges in Synthetic Biological Network Design (2023), NYU Biomedical and Biosystems Conference: Quantitative Biology Session (2020), IEEE Conference on Decision and Control: Identification and Control in Synthetic Biology Invited Session (2018), IEEE Conference on Decision and Control: Context-Dependence in Systems and Synthetic Biology Invited Session (2014)*

Selection committee member, *AACC O. Hugo Schuck Best Paper Award (2022, 2023)*

Reviewer, *Science, Nature Communications, ACS Synthetic Biology, mSystems, Synthetic Biology, Automatica, IEEE Transactions on Automatic Control, IEEE Life Sciences Letters, Complexity, Processes, Frontiers Bioengineering, IEEE Control Systems Letters, IEEE CDC, IFAC ACC, IFAC FOSBE, IFAC World Congress, Israel Science Foundation Grant proposal (2023), Army Research Office Grant proposal (2022)*

Youth Affiliate, *Mohammed bin Rashid Academy of Scientists*

Member, *IEEE, ACS, ACI, SIAM, Biochemical Society, IEEE Control Systems Society, Technical Committee on Systems Biology*

June 14, 2024