

Alexander A. Vinogradov

National University of Singapore,
Department of Pharmacy and Pharmaceutical Sciences
4 Science Drive 2, S9-L6-02, Singapore 117544
+65 6601 1393 • vngrdv@nus.edu.sg • <https://vinogradov.science/>

Curriculum Vitae

updated on March 21, 2026

Academic degrees

- 2012 – 2017 Ph.D. in Biological Chemistry
Massachusetts Institute of Technology, Cambridge, MA, USA
Thesis advisor: Prof. Bradley Pentelute
Thesis title: “*New methods for synthesis and modification of peptides and proteins*”
- 2007 – 2012 Specialist in Chemistry (equivalent to MSc)
Moscow State University, Moscow, Russia
Thesis advisor: Prof. Nikolay Zyk
Thesis title: “*Transformations of 1,1-dichloro-, 1,1-dibromo- and 1-bromo-1-fluorocyclopropanes under the nitrosation reaction conditions*”

Employment since last degree

- Dec 2024 – Presidential Young Professor
National University of Singapore, Department of Pharmacy
Singapore
- 2019 – 2024 Project Assistant Professor
The University of Tokyo, Suga lab
Tokyo, Japan
- 2017 – 2019 Postdoctoral Research Associate
The University of Tokyo, Suga lab
Tokyo, Japan

Primary research articles

† indicates equal contribution

☒ indicates corresponding authorship

1. Y. Ohno, [A. Vinogradov](#),[☒] and H. Suga.[☒] *Discovery of Ultrapotent Heterodimeric Peptide Ligands using Library-vs-Library RaPID Selections*. ASAP: <https://pubs.acs.org/doi/10.1021/jacs.5c23173>.
2. C. Li, Y. Sun, [A. Vinogradov](#),[☒] and H. Suga.[☒] *De novo discovery of bicyclic cysteine-rich peptides targeting gasdermin D*. Proc. Natl. Acad. Sci. U. S. A., **2026**, 123, e2516051123.
3. E. Ang, J. Chang, W. Huang, S. Ullrich, [A. Vinogradov](#), and H. Suga.[☒] *Elucidating Leader Peptide–Enzyme Dynamics in Lactazole Biosynthesis Using mRNA Display*. J. Am. Chem. Soc. **2026**, 148, 2890–2895.

4. S. Haslböck, [A. Vinogradov](#), C. Okada, N. Fujimura, H. Aikawa, T. Sengoku,[✉] and H. Suga.[✉] *Discovery of Supra-Bivalent GSK3 β Inhibitory Peptides Containing an ATP-Mimetic Amino Acid*. *J. Am. Chem. Soc.* **2026**, 148, 368–378.
5. Y. Zhang, [A. Vinogradov](#), Y. Sun, and H. Suga.[✉] *Ribosomal Synthesis of Topologically Defined Thioisindole-Bridged Bicyclic Peptides*. *Angew. Chem. Int. Ed.* **2026**, 65, e17689.
6. [A. Vinogradov](#)[✉] and H. Suga.[✉] *Measuring k_{cat}/K_M values for over 200,000 enzymatic substrates with mRNA display*. *Chem*, **2026**, 12, 102737.
7. D. Nguyen, J. Ramos-Figueroa, [A. Vinogradov](#), Y. Goto, M. Gadgil, R. Splain, H. Suga, W. van der Donk,[✉] and D. Mitchell.[✉] *Aminoacyl-tRNA specificity of a ligase catalyzing non-ribosomal peptide extension*. *J. Am. Chem. Soc.* **2025**, 147, 37893–37898.
8. [A. Vinogradov](#),[✉] S. Pan, and H. Suga.[✉] *Ligand-Enabled Selective Coupling of MIDA Boronates to Dehydroalanine-Containing Peptides and Proteins*. *J. Am. Chem. Soc.* **2025**, 147, 7533–7544.
9. [A. Vinogradov](#),[✉] G. Bashiri, and H. Suga.[✉] *Illuminating Substrate Preferences of Promiscuous $F_{420}H_2$ -Dependent Dehydroamino Acid Reductases with 4-Track mRNA Display*. *J. Am. Chem. Soc.* **2024**, 2024, 146, 31124–31136.
10. Y. Ohno, [A. Vinogradov](#),[✉] and H. Suga.[✉] *Selective pH-Responsive Conjugation between a Pair of De Novo Discovered Peptides*. *J. Am. Chem. Soc.* **2024**, 146, 29429–29440.
11. H. King, M. Bycroft, T. Nguyen, G. Kelly, [A. Vinogradov](#), P. Rowling, K. Stott, D. Ascher, H. Suga, L. Itzhaki, K. Artavanis-Tsakonas.[✉] *Targeting the Plasmodium falciparum UCHL3 ubiquitin hydrolase using chemically constrained peptides*. *Proc. Natl. Acad. Sci. U. S. A.*, **2024**, 121, e2322923121.
12. [A. Vinogradov](#),^{†,✉} Y. Zhang,[†] K. Hamada, S. Kobayashi, K. Ogata, T. Sengoku, Y. Goto,[✉] and H. Suga.[✉] *A Compact Reprogrammed Genetic Code for de Novo Discovery of Proteolytically Stable Thiopeptides*. *J. Am. Chem. Soc.* **2024**, 146, 8058–8070.
13. J. Chang, [A. Vinogradov](#),[✉] Y. Zhang, Y. Goto,[✉] and H. Suga.[✉] *Deep Learning-Driven Library Design for the De Novo Discovery of Bioactive Thiopeptides*. *ACS Cent. Sci.* **2023**, 9, 2150–2160.
14. [A. Vinogradov](#), Y. Zhang, K. Hamada, J. Chang, C. Okada, H. Nishimura, N. Terasaka, Y. Goto,[✉] K. Ogata, T. Sengoku, H. Onaka, and H. Suga.[✉] *De Novo Discovery of Thiopeptide Pseudo-natural Products Acting as Potent and Selective TNIK Kinase Inhibitors*. *J. Am. Chem. Soc.* **2022**, 144, 20332–20341.
15. Y. Zhang, [A. Vinogradov](#),[✉] J. Chang, Y. Goto, and H. Suga.[✉] *Solid-Phase-Based Synthesis of Lactazole-Like Thiopeptides*. *Org. Lett.* **2022**, 24, 7894–7899.
16. [A. Vinogradov](#),[✉] J. Chang, H. Onaka, Y. Goto, and H. Suga.[✉] *Accurate Models of Substrate Preferences of Post-Translational Modification Enzymes from a Combination of mRNA Display and Deep Learning*. *ACS Cent. Sci.* **2022**, 8, 814–824.
17. [A. Vinogradov](#),[✉] M. Nagano, Y. Goto, and H. Suga.[✉] *Site-Specific Nonenzymatic Peptide S/O-Glutamylation Reveals the Extent of Substrate Promiscuity in Glutamate Elimination Domains*. *J. Am. Chem. Soc.* **2021**, 143, 13358–13369.

18. [A. Vinogradov](#),[✉] E. Nagai, J. Chang, K. Narumi, H. Onaka,[✉] Y. Goto,[✉] and H. Suga.[✉] *Accurate Broadcasting of Substrate Fitness for Lactazole Biosynthetic Pathway from Reactivity-Profiling mRNA Display*. *J. Am. Chem. Soc.* **2020**, 142, 20329–20334.
19. [A. Vinogradov](#), M. Shimomura, N. Kano, Y. Goto, H. Onaka, and H. Suga.[✉] *Promiscuous Enzymes Cooperate at the Substrate Level En Route to Lactazole*. *J. Am. Chem. Soc.* **2020**, 142, 13886–13897.
20. [A. Vinogradov](#),[†] M. Shimomura,[†] Y. Goto,[✉] T. Ozaki, S. Asamizu, Y. Sugai, H. Suga,[✉] and H. Onaka.[✉] *Minimal lactazole scaffold for in vitro thiopeptide bioengineering*. *Nat. Commun.* **2020**, 11, 2272.
21. O. Bondarenko,[✉] [A. Vinogradov](#), A. Komarov, G. Karetnikov, N. Zyk, T. Holt, and A. Kutateladze. *Access to 5-fluoroisoxazoles via the nitrosation of geminal bromo-fluoro arylcyclopropanes*. *Tetrahedron.* **2019**, 75, 2861–2865.
22. S. Fleming, T. Bartges, [A. Vinogradov](#), C. Kirkpatrick, Y. Goto, H. Suga, L. Hicks, and A. Bowers.[✉] *Flexizyme-Enabled Benchtop Biosynthesis of Thiopeptides*. *J. Am. Chem. Soc.*, **2019**, 141, 758–762.
23. Z. Gates,[✉] [A. Vinogradov](#), A. Quartararo, A. Bandyopadhyay, Z.-N. Choo, E. Evans, K. Halloran, A. Mijalis, S. Mong, M. Simon, E. Standley, E. Styduhar, S. Tasker, F. Touti, J. Weber, J. Wilson, T. Jamison, and B. Pentelute.[✉] *Xenoprotein engineering via synthetic libraries*. *Proc. Natl. Acad. Sci. U. S. A.*, **2018**, 115, E5298–E5306.
24. C. Zhang, P. Dai, [A. Vinogradov](#), Z. Gates, and B. Pentelute.[✉] *Site-Selective Cysteine–Cyclooctyne Conjugation*. *Angew. Chem. Int. Ed.* **2018**, 57, 6459–6463.
25. [A. Vinogradov](#),[✉] Z. Gates, C. Zhang, A. Quartararo, K. Halloran, and B. Pentelute.[✉] *Library Design-Facilitated High-Throughput Sequencing of Synthetic Peptide Libraries*. *ACS Comb. Sci.* **2017**, 19, 694–701.
26. M. Simon, Y. Maki, [A. Vinogradov](#), C. Zhang, H. Yu, Y.-S. Lin, Y. Kajihara, and B. Pentelute.[✉] *D-amino acid scan of two small proteins*. *J. Am. Chem. Soc.*, **2016**, 138, 12099–12111.
27. [A. Vinogradov](#), Z.-N. Choo, K. Totaro, and B. Pentelute.[✉] *Macrocyclization of Unprotected Peptide Isocyanates*. *Org. Lett.* **2016**, 18, 1226–1229.
28. [A. Vinogradov](#), M. Simon, and B. Pentelute.[✉] *C-Terminal Modification of Fully Unprotected Peptide Hydrazides via in Situ Generation of Isocyanates*. *Org. Lett.* **2016**, 18, 1222–1225.
29. O. Bondarenko,[✉] [A. Vinogradov](#), A. Komarov, A. Smirnov, and N. Zyk. *Synthesis of 5-fluoro- and 5-bromoalkylisoxazoles via nitrosation of 1,1-dihalocyclopropanes with sulfur trioxide activated nitrosyl chloride*. *J. Fluor. Chem.* **2016**, 185, 201–205.
30. [A. Vinogradov](#), E. Evans, and B. Pentelute.[✉] *Total synthesis and biochemical characterization of mirror image barnase*. *Chem. Sci.* **2015**, 6, 2997–3002.
31. O. Bondarenko,[✉] [A. Vinogradov](#), P. Danilov, S. Nikolaeva, A. Gavrilova, and N. Zyk. *Nitrosation of 2-aryl-1,1-dibromocyclopropanes: synthesis of 3-aryl-5-bromoisoxazoles*. *Tetrahedron Lett.* **2015**, 56, 6577–6579.
32. S. Mong,[†] [A. Vinogradov](#),[†] M. Simon, and B. Pentelute.[✉] *Rapid Total Synthesis of DARPin pE59 and Barnase*. *ChemBioChem* **2014**, 15, 721–733.

33. M. Simon, P. Heider, A. Adamo, [A. Vinogradov](#), S. Mong, X. Li, T. Berger, R. Policarpo, C. Zhang, Y. Zou, X. Liao, A. Spokoyny, K. Jensen, and B. Pentelute. *Rapid Flow-Based Peptide Synthesis*. *ChemBioChem* **2014**, 15, 713–720.
34. V. Prituzhalov, E. Ardashnikova, [A. Vinogradov](#), V. Dolgikh, J.-J. Videau, E. Fargin, A. Abakumov, N. Tarakina, and G. Van Tendeloo. *New anion-conducting solid solutions $Bi_{1-x}Tex(O,F)_{2+\delta}$ ($x > 0.5$) and glass-ceramic materials on their base*. *J. Fluor. Chem.* **2011**, 132, 1110–1116.

Review articles

35. [A. Vinogradov](#) and H. Suga. *Introduction to Thiopeptides: Biological Activity, Biosynthesis, and Strategies for Functional Reprogramming*. *Cell Chem. Biol.* **2020**, 27, 1032–1051.
36. [A. Vinogradov](#), Y. Yin, and H. Suga. *Macrocyclic Peptides as Drug Candidates: Recent Progress and Remaining Challenges*. *J. Am. Chem. Soc.* **2019**, 141, 4167–4181.

Book chapters

37. M. Simon, A. Mijalis, K. Totaro, D. Dunkelmann, [A. Vinogradov](#), C. Zhang, Y. Maki, J. Wolfe, J. Wilson, A. Loas, and B. Pentelute. *Automated Fast Flow Peptide Synthesis*, in *Total Chemical Synthesis of Proteins*, John Wiley & Sons, **2021**, 17–58.
38. R. van Neer, [A. Vinogradov](#), and H. Suga. *RaPID Discovery of Macrocyclic Peptide Inhibitors of Protein–Protein Interactions*, in *Inhibitors of Protein–Protein Interactions*, Royal Society of Chemistry, **2020**, 232–246.

Patents and patent applications

1. H. Suga, H. Onaka, Y. Goto, and [A. Vinogradov](#). *Compound library and method for producing compound library*. WO/2020/067550. International Application: PCT/JP2019/038431.
2. H. Suga, Y. Goto, [A. Vinogradov](#), Y. Zhang, and J. S. Chang. *Compound Production Method*. International Application: PCT/JP2023/035472.
3. H. Suga, Y. Zhang, [A. Vinogradov](#). *Compound synthesis and method for discovery of bicyclic ligands*. Application number: 25-0300-001.

Invited presentations

1. *De novo discovery of functional macrocyclic peptides using post-translational modification enzymes*. 7th Annual Peptides and Proteins Society Singapore Symposium (P²S²-2025). December 9, 2025, Singapore.
2. *Accurate Models of Enzymatic Substrate Preferences from Ultra-High-Throughput Experimentation and Deep Learning*. AI For Science Forum. November 18, 2025, Singapore.
3. *De novo discovery of functional macrocyclic peptides using post-translational modification enzymes*. “Medicine meets Science” workshop. October 1, 2025, Singapore.
4. *Ultra-high-throughput profiling of RiPP enzyme specificities using mRNA display*. West China School of Pharmacy-NUS Mini-Symposium. July 17, 2025, Singapore.

5. *Quantitative ultra-high-throughput profiling of RiPP enzyme specificities using mRNA display*. Singapore Symposium on Natural Products and Biosynthetic Enzymes. July 14, 2025, Singapore.
6. *Ultra-high-throughput enzymology in chemical biology & drug discovery*. 2025 Global Young Scientist Summit. January 6, 2025, Singapore.
7. *Comprehensive analysis of substrate preferences of RiPP enzymes using mRNA display and deep learning*. 12th Singapore International Chemical Conference. December 10, 2024, Singapore.
8. *De novo discovery of natural product-like thiopeptides with designed biological activities*. TIDES Asia 2024. March 20, 2024, Kyoto, Japan.
9. *De novo discovery of functional natural product-like thiopeptides*. Invited seminar at NUS Pharmacy & Pharmaceutical Sciences. February 21, 2024, Singapore.
10. *De novo discovery of natural product-like thiopeptides with designed biological activities*. 36th Irsee Natural Product Symposium. February 15, 2024, Irsee, Germany.
11. *FIT-Laz: a platform for thiopeptide bioengineering*. 4th ETHZ-UTokyo Symposium, February 17, 2020, Zurich, Switzerland.
12. *Total synthesis of RNase B. a*. AstraZeneca Distinguished Graduate Fellowship Symposium. November 13, 2013, Waltham, USA.
13. *Transformations of mono- and mixed gem-dihalocyclopropanes under the nitrosation reaction conditions*. International young scientist conference "Lomonosov-2012". April 12, 2012, Moscow, Russia.

Honors and Awards

2025	National Research Foundation Fellowship, Class of 2025
2024	Presidential Young Professor, National University of Singapore
2014	Amgen Summer Graduate Fellowship
2013	AstraZeneca Distinguished Graduate Fellowship
2012	<i>summa cum laude</i> at Moscow State University
2007	Bronze medal at the Regional (Yaroslavl oblast) Chemistry Olympiad
2006	Gold medal at the Regional (Yaroslavl oblast) Astronomy Olympiad
2006	Winner of a "Student of the Year" municipal contest

Teaching

	Course	Program	Dates	Students
24.	PR5227: AI in Pharmaceutical Applications	MPST, NUS	2026 Spring	107
23.	PHS2191: Laboratory Techniques in Pharmaceutical Science I	PHS, NUS	2026 Spring	56
22.	Organic Chemistry I	GSC, UTokyo	2024 Fall	4
21.	Organic Chemistry III	Chem., UTokyo	2024 Summer	42

20.	Special Topics in Organic Chemistry II	Chem., UTokyo	2024 Summer	13
19.	Laboratory work in Organic Chemistry	Chem., UTokyo	2024 Summer	42
18.	Practice in Organic Chemistry	Chem., UTokyo	2024 Spring	14
17.	Organic Chemistry I	GSC, UTokyo	2023 Fall	5
16.	Laboratory work in Organic Chemistry	Chem., UTokyo	2023 Summer	48
15.	Practice in Organic Chemistry	Chem., UTokyo	2023 Spring	17
14.	Organic Chemistry I	GSC, UTokyo	2022 Fall	3
13.	Laboratory work in Organic Chemistry	Chem., UTokyo	2022 Summer	52
12.	Practice in Organic Chemistry	Chem., UTokyo	2022 Spring	25
11.	Organic Chemistry I	GSC, UTokyo	2021 Fall	4
10.	Laboratory work in Organic Chemistry	Chem., UTokyo	2021 Summer	44
9.	Practice in Organic Chemistry	Chem., UTokyo	2021 Spring	29
8.	Organic Chemistry I	GSC, UTokyo	2020 Fall	4
7.	Laboratory work in Organic Chemistry	Chem., UTokyo	2020 Summer	52
6.	Practice in Organic Chemistry	Chem., UTokyo	2020 Spring	15
5.	Laboratory work in Organic Chemistry	Chem., UTokyo	2019 Summer	50
4.	Organic Chemistry I	GSC, UTokyo	2019 Fall	4
3.	General Chemistry II [Teaching Assistant]	Chem., MIT	2013 Fall	25
2.	Organic Chemistry I [Teaching Assistant]	Chem., MIT	2013 Spring	23
1.	General Chemistry I [Teaching Assistant]	Chem., MIT	2012 Fall	24

Mentored students and postdocs

	Name	Dates	Institution	Position/Position after
	Current group			
1.	Wai Lun Chan	2025 –	NUS	Postdoctoral fellow
2.	Siddhant Dhingra	2025 –	NUS	Postdoctoral fellow
3.	Yulong Lu	2025 –	NUS	Ph.D. student
4.	Chi Song	2025 –	NUS	Ph.D. student
5.	Li Quan Koh	2026 –	NUS	Ph.D. student
6.	Zhuojin Zou	2025 –	NUS	M.Sc. student
7.	Zhipeng Li	2025 –	NUS	M.Sc. student
8.	Kaiwen Cui	2025 –	NUS	Research assistant
9.	Joshua Yong	2025 –	NUS	B.Sc. student
10.	Yin Sun	2022 –	UTokyo	Ph.D. student
11.	Luca Danieli	2021 –	UTokyo	Ph.D. student

12. Shih-Yu Pan	2023 –	UTokyo	M.Sc. student
Ph.D. students			
13. Eu Tchen Ang	2022 – 2026, Ph.D.	UTokyo	Postdoctoral researcher at UTokyo
14. Yuto Ohno	2019 – 2025, Ph.D.	UTokyo	Scientist at Daiichi Sankyo
15. Jun Shi Chang	2020 – 2024, Ph.D.	UTokyo	Scientist at Dayra Therapeutics
B.Sc. students			
16. Eric Jensen	2024 – 2025	UTokyo	Ph.D. student at University of Chicago
17. Songlin Tian	2023	UTokyo	M.Sc. student at University of Tokyo
18. Soichiro Nishio	2021 – 2022	UTokyo	M.Sc. student at University of Tokyo
19. Takumi Wake	2020 – 2022	UTokyo	3D modelling and engineering
20. Tang Chi	2021	UTokyo	M.Sc. student at ETH Zurich
21. Zi-Ning Choo	2014 – 2016	MIT	M.D.–Ph.D. student at Cornell University
Interns			
22. Ruobing Zhou	2025	NUS	from Jilin University
23. Simon Mürter	2023 – 2025	UTokyo	from ETH Zurich
24. Harry King	2020, 2022	UTokyo	from Cambridge University
25. Maxwell Sigal	2019	UTokyo	from Northwestern University
26. Yunxiang Du	2019	UTokyo	from Tsinghua University
27. Nassim Maarouf	2019	UTokyo	from Université de Montréal
28. I-Hsuan Lin	2019	UTokyo	from UTokyo
29. Ekaterina Nomerotskaia	2018	UTokyo	from Moscow State University

Professional activities and service

Journal peer review
 >40 manuscripts reviewed

Nature Chemistry
 Nature Communications
 Journal of the American Chemical Society
 Angewandte Chemie
 ACS Central Science
 ACS Catalysis
 Trends in Biochemical Sciences
 Chemical Science
 Nano Letters
 PLOS Computational Biology
 Current Drug Delivery
 Journal of Medicinal Chemistry
 Journal of Organic Chemistry
 ACS Medicinal Chemistry Letters
 Biomacromolecules
 Bioorganic and Medicinal Chemistry

	ChemBioChem Communications Chemistry Israel Journal of Chemistry
Review for funding agencies	Ad hoc reviewer for Austrian Science Fund (2021, 2022)
Commentary articles	For Bioscience and Industry magazine (バイオサイエンスとインダストリー) in <i>B&I</i> 2024, 82, 312; 2024 For SPring-8/SACLA Synchrotron Radiation facility in <i>Spring-8/SACLA Research Frontiers</i> 2023; 2024 For the University of Tokyo School of Science News in <i>School of Science Observations</i> ; 2019
Conference organization	Organizing committee, 7 th Annual Peptides and Proteins Society Singapore Symposium (P ² S ² -2025). December 8–9, 2025, Singapore
PhD Thesis Committees	<u>PhD Defence Examiner:</u> Tooh Yi Wei (Apr 2025) <u>PhD Advisory Committee:</u> Zhang Shuyun (Dec 2025–) Chen Wei Meng (Nov 2025–) <u>PhD Qualifying Exam Examiner:</u> Su Jinya (Apr 2025; QE1) Cao Yuan (Apr 2025; QE2) Winnie Teo (Apr 2025; QE2) Koh Ting Sween Kenny (Nov 2025; QE2)
Departmental Service	Ad hoc interviewer for aptitude-based admissions (2025) UROPS research project examiner (2025–) PR5299 MPST research project examiner (2025–) Deputy staff advisor for Pasteur Student House (Sep 2025–)
Outreach	Junior college open house outreach (Mar 2026) Junior college “Learning Journey” outreach (Mar 2026)

Attracted research funding

2025 – 2030	<i>Ultra-high-throughput enzymology with ensembles of single molecules</i> From: National Research Foundation, Singapore Role: Principal Investigator Funding: S\$3,174,861 (including indirect costs) Grant number: NRF-NRFF17-2025-0005
2024 – 2029	<i>A general platform for ultra-high-throughput substrate profiling of PTM enzymes</i> From: NUS Presidential Young Professorship Role: Principal Investigator Funding: S\$1,250,000 (excluding indirect costs)

- 2022 – 2024 *Accurate analysis of PTM enzymes with an mRNA display/deep learning platform*
From: Japan Society for the Promotion of Science, Scientific research (B)
Role: Principal Investigator
Funding: ¥17,290,000 (including indirect costs)
Grant number: 22H02218, 23K23485
- 2020 – 2021 *Characterization of novel biosynthetic gene clusters for combinatorial synthesis of thiopeptides*
From: Japan Society for the Promotion of Science, Early-Career Scientists
Role: Principal Investigator
Funding: ¥4,160,000 (including indirect costs)
Grant number: 20K15407

Professional society memberships

- 2025 – Peptides and Proteins Society (Singapore), member
2025 – NUS Artificial Intelligence Institute, affiliate
2013 – 2015 American Chemical Society, member

Extracurricular

- 2025 – Scientific advisor to Anomaly Bio
2024 – Founding advisor to Dayra Therapeutics
2023 Consultant for Syneron Tech