Biography

Name : Masatoshi Funabashi

舩橋 真俊（ふなばし まさとし）

Current Position : Research Director and Senior Researcher at Sony Computer Science Laboratories, Inc.

Tokyo, Japan

Other affiliations :

-SynecO, Inc.: Founder & Representative Director (株式会社 Synec0 代表取締役社長)

-Synecoculture Association: Founder & CEO (一般社団法人シネコカルチャー代表理事)

-CARFS (Centre Africain de Recherche et de Formation en Synécoculture) : Directeur scientifique

-Editorial board member of npj Science of Food, Nature Research

-Director of FOOD project at the UniTwin UNESCO Complex Systems Digital Campus program

-Associate fellow at the Complex Systems Institute of Paris Îles-de-France (ISC-PIF)

Research Interests : open complex systems, sustainable agriculture, ecology, life science, citizen science, natural capital, social common capital

7/2023-present : Research Director of Transboundary Research Laboratory at Sony Computer Science Laboratories, Inc.

7/2021-present : Senior Researcher at Sony Computer Science Laboratories, Inc.

9/2019-present : Senior Program Manager at Sony Computer Science Laboratories, Inc.

3/2018-3/2021 : Visiting Senior Scientist (海洋研究開発機構 招聘主任研究員) at JAMSTEC (Japan Agency for Marine-Earth Science and Technology)

7/2016-6/2021 : Researcher at Sony Computer Science Laboratories, Inc.

6/2011-6/2016 : Associate Researcher at Sony Computer Science Laboratories, Inc.

6/2010-5/2011 : Post-doctoral Researcher at Sony Computer Science Laboratories, Inc.

9/2006-5/2010: Ph.D. course (physics) at CREA (Center of Research in Applied Epistemology), Ecole Polytechnique, France

4/2006-8/2006: Predoctoral researcher at the University of Tokyo, Institute of Industrial Science, Aihara laboratory

4/2004-3/2006: Master (Es Science) course at the University of Tokyo, Division of Transdisciplinary Sciences, Department of Complexity Sciences and Engineering.

The master thesis “Modeling birdsong learning with a chaotic Elman network” received top evaluation, with the honor of representing all master courses in the Division of Transdisciplinary Sciences at the

graduation ceremony.

4/2000-3/2004: Bachelor (Equivalent to Master) course at the University of Tokyo, Faculty of Agriculture, Veterinary Medical Sciences

4/1998-3/2000: University of Tokyo, Undergraduate Science II course

Language : Professional level of English, French, Japanese

Selected Peer-Reviewed Publications

Agriculture and ecology :

・Kousaku Ohta, Godai Suzuki, Kae Miyazawa, Masatoshi Funabashi, “Open systems navigation based on system-level difference analysis – Case studies with urban augmented ecosystems,” Measurement: Sensors, 2022, 100401, ISSN 2665-9174, https://doi.org/10.1016/j.measen.2022.100401.

・Masatoshi Funabashi and Tomoyuki Minami “Dynamical assessment of aboveground and underground biodiversity with supportive AI” Measurement: Sensors Volume 18, December 2021, 100167 https://doi.org/10.1016/j.measen.2021.100167

・Kousaku Ohta and Masatoshi Funabashi “Complementary analyses of soil microbial and chemical properties and human observation on augmented ecosystems in urban environment” Measurement: Sensors Volume 18, December 2021, 100333 https://doi.org/10.1016/j.measen.2021.100333

・M. Funabashi, "Human Augmentation of Ecosystems: Objectives for food production and science by 2045." npj Science of Food, 2018. **[This perspective paper defines a novel paradigm, the anthropogenic augmentation of ecosystems, as a solution to health-diet-environment trilemma.]**

・M. Funabashi, “Augmentation of Plant Genetic Diversity in Synecoculture: Theory and Practice in Temperate and Tropical Zones.” in Genetic Diversity in Horticultural Plants, Series: Sustainable Development and Biodiversity (ed. Nandwani, D. Springer, 2018).

・M. Funabashi, “Synecological farming: Theoretical foundation on biodiversity responses of plant communities” Plant Biotechnology, special issue plants environmental responses, 16.0219a **[This article explains the integrated model of physiological and ecological optima, IMPEO, which makes the theoretical foundation of Synecoculture.]**

・M. Funabashi “Synecological Farming for Mainstreaming Biodiversity in Smallholding Farms and Foods : Implication for Agriculture in India.” Indian Journal of Plant Genetic Resources, Vol. 30 (2), 2017

・M. Funabashi et al., “Foundation of e-laboratory: Open systems exploration for ecosystems leveraging” First Complex Systems Digital Campus World E-Conference 2015, Springer Proceedings in Complexity, 2017, Pages 351-374

・M. Funabashi, “IT-Mediated Development of Sustainable Agriculture Systems–Toward a Data-Driven Citizen Science” Journal of Information Technology and Application in Education (JITAE), 2013

Food Science :

・Funabashi, M. Living in a Hotspot of City and Biodiversity. The Case of Synecoculture. P. 252-253. In: Mejía, M.A., Amaya-Espinel, J.D. (eds.). BiodiverCities by 2030: Transforming Cities with Biodiversity. Bogotá. Instituto de Investigación de Recursos Biológicos Alexander von Humboldt. 2022. 288 pages.

・Ohta, K.; Kawaoka, T.; Funabashi, M. Secondary Metabolite Differences between Naturally Grown and Conventional Coarse Green Tea. Agriculture2020, 10, 632.

- M. Funabashi, “In Natura Diet: Statistical Invariance Analysis and Synecoculture Experiment” proceedings of the 11th International Food Data Conference, Hyderabad, India, 2015.

- M. Funabashi, “Comparison of major minerals uptake between conventional and non-tillage/non-fertilizer/non-chemical vegetables in Japan” proceedings of the Nutrition Society, 72 (OCE5), E313 (2013)

Information and Communication Technologies (ICT) :

・Aotake, S., Takanishi, A., Funabashi, M. (2023). Modeling Ecosystem Management Based on the Integration of Image Analysis and Human Subjective Evaluation - Case Studies with Synecological Farming. In: Collet, P., Gardashova, L., El Zant, S., Abdulkarimova, U. (eds) Complex Computational Ecosystems. CCE 2023. Lecture Notes in Computer Science, vol 13927. Springer, Cham. https://doi.org/10.1007/978-3-031-44355-8_11

・M. Funabashi, “Citizen Science and Topology of Mind: Complexity, Computation and Criticality in Data-Driven Exploration of Open Complex Systems” Entropy 2017, 19, 181. **[This article defines a novel concept of scientific reproducibility, namely the inter-subjective objectivity.]**

・M. Funabashi, “Open systems exploration – An example with ecosystems management-” First Complex Systems Digital Campus World E-Conference 2015, Springer Proceedings in Complexity, 2017, Pages 223-243

・M. Funabashi, “Invariance in Vowel Systems” J. Acoust. Soc. Am. 137, 2892 (2015)

・M. Funabashi, “Synthetic Modeling of Autonomous Learning with a Chaotic Neural Network” International Journal of Bifurcation and Chaos Vol. 25, No. 04, 1550054 (2015)

- M. Funabashi, “Network Decomposition and Complexity Measures: An Information Geometrical Approach” Entropy 2014, 16(7), 4132-4167; doi:10.3390/e16074132

・M. Funabashi, D. Chavalarias, and J.-P. Cointet, “Order-wise Correlation Dynamics in Text Data” in Complex Network, Studies in Computational Intelligence 207, Springer pp.161-172 (2009)

Publications en Français:

・M. Funabashi, « Fondation de la Synécoculture: Vers une agriculture de synthèse écologique et rentable » dans les Actes du colloque Transversalités de l'agriculture biologique – 23&24 juin 2011 – Page 500-506

・M. Funabashi, « La gestion agro-environnementale : les atouts de la synécoculture » dans les Actes du Colloque de Cerisy "Villes et Territoires Résilients" 19-26 Septembre 2017

Publications from the Synecoculture project:

・Masatoshi Funabashi, editor « Synecoculture Manual 2016 Version » (English Version). Research and Education material of UniTwin UNESCO Complex Systems Digital Campus, e-laboratory: Open Systems Exploration for Ecosystems Leveraging, No.2.

- André Tindano and Masatoshi Funabashi, editor « Proceedings of the 1st African Forum on Synecoculture » (English Version). Research and Education material of UniTwin UNESCO Complex Systems Digital Campus, e-laboratory: Open Systems Exploration for Ecosystems Leveraging, No.5.

- André Tindano and Masatoshi Funabashi, editor « Proceedings of the 2nd African Forum on Synecoculture » (English Version). Research and Education material of UniTwin UNESCO Complex Systems Digital Campus, e-laboratory: Open Systems Exploration for Ecosystems Leveraging, No.7.

- André Tindano and Masatoshi Funabashi, editor « Proceedings of the 3rd African Forum on Synecoculture » (English Version). Research and Education material of UniTwin UNESCO Complex Systems Digital Campus, e-laboratory: Open Systems Exploration for Ecosystems Leveraging, No.10.

- Elee Messaoudi, André Tindano et Masatoshi Funabashi « Actes du 4e Forum African sur la Synécoculture » Matériel éducatif et de recherche du Complex Systems Digital Campus, programme UniTwin de l'UNESCO, laboratoire en ligne : Exploration en systèmes ouverts pour l'effet de levier écosystémique, No. 11.

・André Tindano and Masatoshi Funabashi, editor « Actes du 5e Forum Africain sur la Synécoculture / Proceedings of the 5th African Forum on Synecoculture » (French-English Version). Research and Education material of UniTwin UNESCO Complex Systems Digital Campus, e-laboratory: Open Systems Exploration for Ecosystems Leveraging, No.11.

・Synecoculture™ Principles Learning Kit Ver. 0.33e October, 2020 Sony Computer Science Laboratories, Inc. Synecoculture Association Written by : Kei Fukuda, Yoko Honjo Supervised by : Masatoshi Funabashi

・André Tindano and Masatoshi Funabashi, editor « Programme et Plan de Diffusion de la Synécoculture dans les Pays de la CEDEAO» (in French). Research and Education material of UniTwin UNESCO

Complex Systems Digital Campus, e-laboratory: Human Augmentation of Ecosystems, No. 1, March 2021.

・Pélagie Tchilalo Assi, André Tindano and Masatoshi Funabashi, editor “Actes du 6e Forum Africain sur la Synécoculture / Proceedings of the 6th African Forum on Synecoculture” (French-English Version). Research and Education material of UniTwin UNESCO Complex Systems Digital Campus, e-laboratory: Human Augmentation of Ecosystems, No. 2 (2022)

日本語の文献:

・船橋真俊(2019)「一万年目の農業」門脇 浩明・立木 佑弥 編『遺伝子・多様性・循環の科学』京都大学学術出版会

・船橋真俊(2019)「食と水循環−アフリカでの挑戦−」所眞理雄・高橋桂子 編著『水大循環と暮らし２ 流域水循環と持続可能な都市』丸善プラネット

・船橋真俊(2016)「水循環と生態系−農業を媒介として」所眞理雄・高橋桂子 編著『水大循環と暮らし―21 世紀の水環境を創る』丸善プラネット

・AERA 2021 年 4/19 号「現代の肖像」

・WIRED VOL.40 特集：地球のためのガストロノミー「がんばれ人類! 拡張生態系から学ぶ、これからの生存の作法」

・船橋真俊『メタ・メタボリズム 宣言』p.50−72『人は明日どう生きるのか――未来像の更新』南條史生 アカデミーヒルズ 編 森美術館 企画協力 NTT 出版 発行

Other Publications

・M Funabashi “Kinetic diversity indices for the characterization of topsoil formation in natural and augmented ecosystems“ FAO. 2021. Keep soil alive, protect soil biodiversity – Global Symposium on Soil Biodiversity 19–22 April 2021. Proceedings. Rome.

・K Yoshida, Y Shimizu-Yoshida, M Funabashi "Functional and compositional characteristics of conventionally, organically and naturally grown cabbage and carrots" Proceedings of the 4th International Conference on Food Studies, Prato, 2014

・K Yoshida, M Funabashi "Taste analysis on conventionally, organically and naturally grown cabbage" Proceedings of the 1st IMEKOFOODS conference in Rome, Italy, 2014

・M Funabashi, K Aihara "Modeling birdsong learning with a chaotic Elman network"Artificial Life and Robotics 11 (2), 162-166, 2007

・K Ohta, T Takeshita, M Funabashi, S Oda "Naturally grown rucola, Eruca sativa, contains more α-linolenic acid than conventionally grown rucola" Plant Biotechnology 33 (4), 277-279, 2016

・M Funabashi "Dynamical system and information geometry-a complementary approach to complex

systems" Ph.D thesis, Ecole Polytechnique, Paris, France, 2010

・M Funabashi "Water and Ecosystem Cycles Mediated by Plant Genetic Resources for Food and Agriculture" in Genetic Diversity in Plant Species-Characterization and Conservation, 2018

・T Mizoguchi, M Funabashi "Environmental responses of plants: Biological interactions in the homogenous population or community (mixed populations)" Plant Biotechnology 33 (4), 211-212, 2016

・M Funabashi, S Aoki "Balancing autonomy and environmental response with hierarchical chaotic dynamics" 2008 IEEE International Conference on Robotics and Biomimetics, 1329-1336, 2009

・M Funabashi, K Ohta "Sustainable Development Goals (SDGs)" New Breeze, Spring 2019

・M Funabashi "Farm work support device and method, program, recording medium, and farm work support system" US Patent App. 14/408,476, 2015

・Takuya Otani, Akira Itoh, Hideki Mizukami, Masatsugu Murakami, Shunya Yoshida, Kota Terae, Taiga Tanaka, Koki Masaya, Shuntaro Aotake, Masatoshi Funabashi, and Atsuo Takanishi. 2023. “Agricultural Robot under Solar Panels for Sowing, Pruning, and Harvesting in a Synecoculture Environment” Agriculture 13, no. 1: 18. https://doi.org/10.3390/agriculture13010018

・Funabashi, M. (2023). Vegee Brain Automata: Ultradiscretization of Essential Chaos Transversal in Neural and Ecosystem Dynamics. In: Collet, P., Gardashova, L., El Zant, S., Abdulkarimova, U. (eds) Complex Computational Ecosystems. CCE 2023. Lecture Notes in Computer Science, vol 13927. Springer, Cham. https://doi.org/10.1007/978-3-031-44355-8_10

Websites

SynecO, Inc.:

https://www.syneco.inc/

Synecoculture Association:

https://synecoculture.org

African Center of Research and Training in Synecoculture (CARFS):

https://www.facebook.com/carfs.org/

SonyCSL Synecoculture project page:

https://www.sonycsl.co.jp/tokyo/407/

Synecoculture featured in Sony Stories:

https://www.sony.net/brand/stories/en/our/products_services/sonycsl-ga/

UniTwin UNESCO Complex Systems Digital Campus e-laboratory webpage (All publications of Synecoculture project are available):

https://www.elab-ose4el.net/

Exhibitions

・3/2022-11/2023: ソニーグループのブランドショールーム「Sony Square」にて、協生農法(Synecoculture)と拡張生態系に関する展示を開始しました。

・12/2021-5/2022 : 21_21 DESIGN SIGHT holds the exhibition “The Year 2121: Futures In-Sight” in which Masatoshi Funabashi presents his artwork “Meta-Metabolism Declaration – Improvegetation.”

・9/2021 : Synecoculture and Augmented Ecosystems were featured in Garden TOKYO at Ars Electronica 2021, as a part of the section “Highlighting Collective Movements.”

・8/2021 : Syneco Portal, a planter-sized kit for the first-hand learning experience of Synecoculture principles, was demonstrated at the “Research for the Future of Humanity” exhibition organized by Sony CSL at Ginza Sony Park.

Awards and honors

・French government scholarship 2006-2008 (boursier du gouvernement français, Promotion Simone de Beauvoir)

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