# Byoungkwon An (B. An)

**CONTACT INFORMATION**

Email: *an@csail.co.kr, dran@csail.mit.edu*
Web: *www.drancom.com*

**EDUCATION**

**Massachusetts Institute of Technology (MIT)**, Cambridge, MA, USA      Advisor: Daniela Rus
S.M. in Computer Science, September 2011
Thesis: Sticker Controller and Programming for Smart Sheets (Self-Folding Sheets)

**Soongsil University**, Seoul, Korea      Advisor: Jim Min Kim
B.A. in Physics, February 2004
Thesis: Scaling of Dynamic Surface Growth Model on Fractal Dimension

**PUBLICATIONS**

[19] Wang, W. , Chen, S., **An, B.**, Huang, K., Bai, T., Xu, M., Bellot, G., Ke, Y., Xiang, Y., and Wei, B., *Complex wireframe DNA nanostructures from simple building blocks*, Nature Communications, 10:1067, 2019, *pdf*

[18] **An, B.**, Miyashita, S., Ong, A., Aukes, D., L., Tolley, M., Demaine, E., Demaine, M., Wood, R., Rus, D., *An End-to-End Approach to Self-Folding Origami Structures*, IEEE Transactions on Robotics, 34(6):1409-1424, 2018, *pdf*

[17] **An, B.**, Tao, Y., Gu, J., Cheng, T., Chen, X., Zhang, X., Zhao, W., Do, Y., Takahashi S., Wu, H., Zhang, T., Yao, L., *Thermorph: Democratizing 4D Printing of Self-Folding Materials and Interfaces*, ACM CHI Conference on Human Factors in Computing Systems (CHI), Montreal, QC, Canada, 2018, *pdf*

[16] Wang G., Cheng, T., Do, Y., Yang, H., Tao, Y., Gu, J., **An, B.**, Yao, L., *Printed Paper Actuator: A Low-cost Reversible Actuation and Sensing Method for Shape Changing Interfaces*, ACM CHI Conference on Human Factors in Computing Systems (CHI), Montreal, QC, Canada, 2018, *pdf*

[15] **An, B.**, Demaine, E., Demaine, M., Ku, J., *Computing 3SAT on a Fold-and-Cut Machine*, Canadian Conference on Computational Geometry (CCCG), Ottawa, ON, Canada, 2017, *pdf*

[14] Han, D., Qi, X., Myhrvold, C., Wang, B., Dai, M., Jiang, S., Bates, M., Liu, Y., **An, B.**\*, Zhang, F.\*, Yan, H.\*, Yin, P.\* (\* indicates corresponding authors), Single-Stranded DNA and RNA Origami, Science, 358: eaao2648, 2017, *pdf*

[13] **An, B.**, Han, D., Bates, M., Zhao, Wei., Wang, M., Tinnus, M., Zyracki, M., Wang, M., Yin, P., *Computational Design and Self-Assembly for Single Stranded DNA Origami*, Foundations of Nanoscience: Self-Assembled Architectures and Devices (FNANO), Snowbird, UT, USA, 2016, abstract, **selected oral presentation**

[12] Miyashita, S., DiDio, I., Ananthabhotla, I., **An, B.**, Sung, C., Arabagi, S., Rus D., *Folding Angle Regulation by Curved Crease Design for Self-Assembling Origami Propellers*, Journal of Mechanisms and Robotics (JMR), 7(2):021013, 2015, *pdf*

[11] Niiyama., R., Sun, X., Sung, C., **An, B.**, Rus, D., Kim, S., *Pouch Motors: Printable Soft Actuators Integrated with Computational Design*, Soft Robotics, 2(2):59-70, 2015, *pdf*

[10] Khosla, A., **An, B.**, Lim, J., Torralba, A., *Looking Beyond the Visible Scene*, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), Columbus, OH, USA, 2014, equal contribution, *pdf*

[9] **An, B.**, Miyashita, S., Tolley, M., Aukes, D., Meeker, L., Demaine, E., Demaine, M., Wood, R., Rus, D., *An End-to-End Approach to Making Self-Folded 3D Surface Shapes by Uniform Heating*, IEEE International Conference on Robotics and Automation (ICRA), Hong Kong, China, 2014, *pdf video*

[8] **An, B.**, Rus, D., *Designing and Programming Self-Folding Sheets*, Robotics and Autonomous Systems, 62(7):976-1001, 2014, *pdf  video*

[7] Mehta, A., Bezzoy N., **An, B.**, Gebhardy, P., Lee, I., Kumary, V., Rus, D., *A Design Environment for the Rapid Specification and Fabrication of Printable Robots*, International Symposium on Experimental Robotics (ISER), Marrakech and Essaouira, Morocco, 2014, *pdf*

[6] **An, B.**, Rus, D., *Programming and Controlling Self-Folding Robots*, IEEE International Conference on Robotics and Automation (ICRA), Saint Paul, MN, USA, 2012, *pdf*

[5] Paik, J., **An, B.**, Rus, D., Wood, R., *Robotic Origamis: Self-Morphing Modular Robots*, International Conference on Morphological Computation (ICMC), Venice, Italy, 2012, *pdf*

[4] **An, B.**, Benbernou, N., Demaine, E., Rus, D., *Planning to Fold Multiple Objects from a Single Self-Folding Sheet*, Robotica, 29(1):87-102, 2011, *pdf*

[3] Hawkes, E., **An, B.**, Benbernou, N., Tanaka, H., Kim, S., Demaine, E., Rus, D., Wood, R., *Programmable Matter by Folding*, Proceedings of the National Academy of Sciences (PNAS), 107(28):12441-12445, 2010, *pdf video*

[2] **An, B.**, Rus, D., *Making Shapes from Modules by Magnification*, IEEE/RSJ International Conference on Intelligent Robots and System (IROS), Taipei, Taiwan, 2010, *pdf video*

[1] **An, B.**, *EM-Cube: Cube-shaped, Self-Reconfigurable Robots Sliding on Structure Surface*, IEEE International Conference on Robotics and Automation (ICRA), Pasadena, CA, USA, 2008, *pdf video1 video2*

WORK EXPERIENCE

**CEO, Founder, CSAIL (Computer Science and Artificial Intelligence Lab.) Inc.**            2025 – Present
- Founded computer science and artificial intelligence company
- Focused on AI Robot, unsupervised learning-based AI and reinforcement learning-based AI

**Co-Founder, Bashan Networks Co.**            2001 – 2003
- Founded software engineering consulting company with Professor Nam-Yong Lee
- Established partnership with IBM Rational Software to share consulting and education expertise
- Consulted and trained on object-oriented analysis and design (OOAD), and software architecture for government institutes and companies, including the Institute of Information Technology Advancement in the Ministry of Information and Communication of Korea, and Hyundai Motor Company

**Co-Founder, IFCOM Tec.**            1999 – 2001
- Designed and developed a distributed system of information sharing, internet broadcast and communication for investment and securities companies
- Designed and developed a distributed system of interactive internet broadcast

RESEARCH EXPERIENCE

**Dran Computer Science Lab.**            2022 – 2025
*Computer Science and Artificial Intelligence Consultant*

**Autodesk Research**, Autodesk            2014 – 2017
*Principal Research Scientist*

**Computer Science and Artificial Intelligence Lab.**, MIT            2017
*Visiting Scholar, Advisor Erik Demaine*

**Morphing Matter Lab.**, Carnegie Mellon University (CMU)            2017
*Research Affiliate, Advisor Lining Yao*

**Computer Science and Artificial Intelligence Lab.**, MIT
*Visiting Alumni Scholar, Advisor Daniela Rus*            2011 – 2014
*Graduate Research Assistant, Advisor Daniela Rus*            2008 – 2011

**Nanophysics Lab.**, Korea University            2005 – 2006
*Research Engineer, Advisor Se-Jong Kahng*

**Statistical Physics Lab.**, Soongsil University            2002 – 2003
*Undergrad Research Assistant, Advisor Jin Min Kim*

**Software Engineering Lab.**, Soongsil University            2001
*Undergrad Research Assistant, Advisor Nam-Yong Lee*

TEACHING EXPERIENCE

**Computational Physics**, Physics Department, Soongsil University            2003
*Teaching Assistant*

ART EXHIBITION

**An, B.** and Rus, D.,*Self-Folding Sheet*, Modern By Design, Atlanta High Museum of Art, GA            2011
**An, B.** et al., *Programmable Matter Design Pipeline*, Programmable Materials, MIT Keller Gallery, MA            2015

| | | |
|---|---|---|
| HONORS AND AWARDS | 2nd Place for *1st Planetary Contingency Challenge*, IEEE International Conference on Robotics and Automation, Pasadena, CA, USA,  2008 | |
| | *Best Undergraduate Thesis*, Physics Department, Soongsil University,  2003 | |
| | *Four Year Full Tuition Scholarship*, Soongsil University,  1999 | |
| PROFESSIONAL ACTIVITY | **Reviewer**, Nature Communications | 2025 – Present |
| | **Reviewer**, IEEE International Conference on Robotics and Automation (ICRA) | 2010 – Present |
| | **Reviewer**, Robotica, Cambridge Journal | 2014 – Present |
| PATENT | **An, B.**, *FET (Field Effect Transistor) Nerve Electronic Chip*, 10-0765960, KR, 2006 | |
| MEDIA COVERAGE (SELECTED) | MIT News (MIT Main), Bake Your Own Robot, May 30, 2014 | |
| | NBC News, *Right Out of the Oven: MIT Scientists Bake Self-Building Origami Robots*, May 30, 2014 | |
| | Science Daily, *New printable robots could self-assemble when heated*, May 30, 2014 | |
| | CNN, *Edge of Discovery, Transformers could be a reality!*, June 1, 2011 | |
| | MIT News (MIT Main), *Shape-Shifting Robots*, August 4, 2010 | |
| | Discovery News, Origami Robot Makes Shapes on Demand, July 7, 2010 | |
| | CNET, Robotics meet origami in self-folding sheets, June 29, 2010 | |
| | Nature News, *Origami that folds itself*, June 28, 2010 | |
| | MSNBC, *'Programmable matter' may shape future tools*, June 28, 2010 | |
| | Popular Science, *Video: "Smart Sheets" Can Self-Assemble Into Airplanes, Boats*, June 28, 2010 | |
| | Phys.org, *Shape-shifting sheets automatically fold into multiple shapes*, June 28, 2010 | |
| | Harvard Gazette, *Shape-shifting sheets automatically fold into multiple shapes*, June 28, 2010 | |