Doron Kam

Ph.D. | Tel-Hai University, Israel

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Doron Kam
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I do hands-on interdisciplinary research. I have developed novel inks, instrumentation, and techniques for additive manufacturing, together with quantitative measurements of physical properties. I am drawn to problems that sit at the intersection of fields. I like hearing about scientific challenges, reframing them, and finding experimental directions that are not always obvious at first glance. I love my work.

🎓 Education

2013 **B.Sc**. in Physics - Faculty of Science, The Hebrew University of Jerusalem, Jerusalem, Israel.

2016 **M.Sc.** (*Cum laude*) in Plant Science - Robert H. Smith Faculty of Agriculture, Food and Environment, The Hebrew University of Jerusalem, Rehovot, Israel.
Title: **Understanding the role of cellulose nanocrystal surface charge on rheology and chirality**

2022 **Ph.D.** in Plant Science & Chemistry - The Hebrew University of Jerusalem, Jerusalem, Israel.
Title: **Cellulose nanocrystals (CNC) for 2D and 3D printed structures**

💼 Experience

2026- | Senior Lecturer, Food Sciences Department, Tel-Hai University.

2024-2025 | Postdoctoral fellow - University of California, Irvine
Advisor: Prof. Alon Gorodetsky
- Cephalopod (squids, octopuses, cuttlefish) - inspired materials and systems.
- Genetic engineering of plants and plant-based materials.

2023-2024 | Postdoctoral fellow - The Hebrew University of Jerusalem
Advisor: Prof. Shlomo Magdassi
- Development of an innovative stereolithography-based 3D printing ink composition without a photoinitiator.
- Utilizing 3D printed scaffold to facilitate cell growth for tissue engineering by stereolithography 3D printing technology using ink composition containing only non-modified proteins.

2020- | Founding team member of the original IP of Daika Ltd. (Daikawood.com)
Wood-based Raw Materials for Manufacturing
- Implementing 100% printed wood research to applicative TRL 4.
- Funding stage: seed 2 - 1M$, Dec. 2023; seed 1 - 3.4M$, Jun. 2021.

2016-2022 | Ph.D. - The Hebrew University of Jerusalem
Advisors: Prof. Oded Shoseyov & Prof. Shlomo Magdassi
- Printing Resilin protein complex structures with a sub-micron resolution using a two-photon printing process. Achieving highly elastic and resilient objects using nanoindentation dynamic mechanical analysis.
- Utilizing CNC as a rheological modifier and a novel water-compatible photoinitiator to facilitate DIW 3D printed hydrogels without compromising on printing time.
- Investigated plant cell wall material in the design and 3D printing of 100% wood-based objects leading to enhanced mechanical properties.
- Designed, built, and characterized the Direct Cryo Writing (DCW) 3D printing technique, which encompasses freeze-drying with 3D printing. DCW combines DIW 3D printing with freeze casting allowing the formation of low-concentration hydrogels to evolve into aerogels with aligned structures.

2016-2017 | Data scientist - GemmaCert (Gemmacert.com)
Non-destructive real-time identification, and quantification of the Cannabis active compounds
- Studied light-matter interaction of Cannabis flowers with numerous spectroscopy to reach non-invasive cannabinoid detection at an early-stage startup company.
- Leading the development of the first data model (supervised learning).

2014-2016 | M.Sc. - The Hebrew University of Jerusalem
Advisor: Prof. Oded Shoseyov
- Studied particle-particle interaction of cellulose nanocrystal in aqueous suspension.
- The role of surface charge on lyotropic liquid crystal phase separation.

Publications

M.Sc.

1. E. Abraham, D. Kam, Y. Nevo, R. Slattegard, A. Rivkin, S. Lapidot, O. Shoseyov, **Highly Modified Cellulose Nanocrystals and Formation of Epoxy-Nanocrystalline Cellulose (CNC) Nanocomposites**. *ACS Appl. Mater. Interfaces*. **8**, 28086–28095 (2016).
2. Y. Calahorra, A. Datta, J. Famelton, D. Kam, O. Shoseyov, S. Kar-Narayan, **Nanoscale electromechanical properties of template-assisted hierarchical self-assembled cellulose nanofibers**. *Nanoscale*. **10**, 16812–16821 (2018).
3. T. Abitbol,* D. Kam,* Y. Levi-Kalisman, D. G. Gray, O. Shoseyov, **Surface Charge Influence on the Phase Separation and Viscosity of Cellulose Nanocrystals**. *Langmuir*. **34**, 3925–3933 (2018). (*Equal contribution)

Ph.D.

4. D. Morantes, E. Muñoz, D. Kam, O. Shoseyov, **Highly charged cellulose nanocrystals applied as a water treatment flocculant**. *Nanomaterials*. **9**, 1–13 (2019).
5. D. Kam, M. Chasnitsky, C. Nowogrodski, I. Braslavsky, T. Abitbol, S. Magdassi, O. Shoseyov, **Direct Cryo Writing of Aerogels Via 3D Printing of Aligned Cellulose Nanocrystals Inspired by the Plant Cell Wall**. *Colloids and Interfaces*. **3**, 46 (2019).
6. D. Kam, M. Layani, S. BarkaiMinerbi, D. Orbaum, S. Abrahami BenHarush, O. Shoseyov, S. Magdassi, **Additive Manufacturing of 3D Structures Composed of Wood Materials**. *Adv. Mater. Technol.* **4**, 1900158 (2019).
7. D. Kam, A. Braner, A. Abouzglo, L. Larush, A. Chiappone, O. Shoseyov, S. Magdassi, **3D Printing of Cellulose Nanocrystal-Loaded Hydrogels through Rapid Fixation by Photopolymerization**. *Langmuir*. **37**, 6451–6458 (2021).
8. D. Kam,* I. Levin,* Y. Kutner, O. Lanciano, E. Sharon, O. Shoseyov, S. Magdassi, **Wood Warping Composite by 3D Printing**. *Polymers.* **14**, 733 (2022). (*Equal contribution)
   Press coverage (Went viral after ACS Fall 2022 presentation): PHYS.ORG, EurekAlert!, ACS Newsroom, NewScientist, INVERSE, plastic molding news, SYFY, Fabbaloo, Daily Mail, Tipblogg, NEW ATLAS, Public News Time, 3D printing.com, designboom, 3D Printing Industry, CBSNEWS, ABC News Today, ed engineering-designer, AZO materials, StudyFinds, tct magazine, ZME SCIENCE, The New York Daily Paper, BLOG TECHO, Woody House, core77, ars TECHNICA, THE TIMES OF ISRAEL, Chemistry World.
9. S. Roig-Sanchez, D. Kam, N. Malandain, E. Sachyani-Keneth, O. Shoseyov, S. Magdassi, A. Laromaine, A. Roig, **One-step double network hydrogels of photocurable monomers and bacterial cellulose fibers**. *Carbohydr. Polym.* **294**, 119778 (2022).
10. D. Kam, A. Olender, A. Rudich, Y. Kan-Tor, A. Buxboim, O. Shoseyov, S. Magdassi, **3D Printing of Resilin in Water by Multiphoton Absorption Polymerization**. *Adv. Funct. Mater.* 2210993 (2023). (Journal cover)
11. I. Binyamin, E. Grossman, M. Gorodnitsky, D. Kam, S. Magdassi, **3D Printing Thermally Stable High-Performance Polymers Based on a Dual Curing Mechanism**. *Adv. Funct. Mater.* 2214368 (2023).
12. T. Naor, S. Gigi, N. Waiskopf, G. Jacobi, S. Shoshani, D. Kam, S. Magdassi, E. Banin, U. Banin, **ZnO Quantum Photoinitiators as an All-in-One Solution for Multifunctional Photopolymer Nanocomposites**. *ACS Nano*, ***17***(20), 20366–20375 (2023).

Postdoc (HUJI)

13. D. Kam,* O. Rulf,* A. Reisinger, R. Lieberman, S. Magdassi, **3D printing by stereolithography using thermal initiators**. *Nat. Commun.* **15**, 2285 (2024). (*Equal contribution)
    Press coverage: The Academic
14. D. Kam, M. Yam Moshkovitz, O. Bliah, A. Kamyshny, S. Magdassi, **Additive manufacturing: from 2D to 4D printing**. *The Israel Chemist and Chemical Engineer.* 33, (2024).
15. D. Kam,* R. Liebermana,* N. Trink, O. Rulf, S. Magdassi, **Vat photopolymerization printing by thermal polymerization utilizing carbon nanotubes as photothermal converters**. *Virtual Phys. Prototyp.* **19**(1), (2024). (*Equal contribution)
16. A. Bunin, O. Harari-Steinberg, D. Kam, T. Kuperman, M. Friedman-Gohas, B. Shalmon, L. Larush, S. I. Duvdevani, S. Magdassi, **Digital light processing printing of non-modified protein-only compositions**. *Mater. Today Bio.* 101384, (2024).

Book Chapters

1. O. Shoseyov, D. Kam, T. Ben Shalom, Z. Shtein, S. Vinkler, Y. Posen, **Nanocellulose Composite Biomaterials in Industry and Medicine**. In: *Extracellular Sugar-Based Biopolymers Matrices. Biologically-Inspired Systems*, E. Cohen, H. Merzendorfer, Eds. (Springer International Publishing, Cham, 2019), pp. 693–784.

Patents

1. D. Kam, M. Layani, O. Shoseyov, S. Magdassi. **Wood paste and objects made therefrom.** US20200369888A1
2. A. Bunin, O. Harari-Steinberg, D. Kam, S. Duvdevani, S. Magdassi, **Photopolymerization of non-modified proteins.** US20260021222A1

Other Activities

2. **3D printing spent coffee ground**. Y. Kutner, D. Kam.
   1st place at the 2020 Creativity Challenge of the Center for Innovation and Entrepreneurship.

1. **FilteRisk, emergency water purification using Ag NPs synthesized directly onto a solid fiber**.
   G. Goldstein, T. Abitbol, D. Kam.
   2nd place at Joint-Forces, a joint Hebrew University-Bezalel Arts & Science competition.

Mentorship & Teaching

2016-2017 **Teaching** - The Unit for Equal Opportunities, 'physics' (71031 & 71032; B.Sc 1st year).

2017-2019 **Advisor/Supervisor high school student project**, Ariel Braner, Alpha research program in the sciences. Winning an honorable mention (XLAB 3 week science camp), The Israel Young Scientists and Developers Contest 2019
Title: **3D printed UV curable hydrogel using cellulose nanocrystal as a rheological modifier**.

2018-2021 **Teaching** - The Faculty of Agriculture, 'physics (B) (extended)' (71032; B.Sc 1st year).

2018-2020 **Advisor/Supervisor high school student project**, Yinon Kutner, Alpha research program in the sciences.
Title: **3D printed wood warping**.

2019-2021 **Teaching** - The Faculty of Agriculture, 'physics (A) (extended)' (71031; B.Sc 1st year).

Oral Presentations

1. **Direct Cryo Writing (DCW) 3D Printed Cellulose nanocrystals - Xyloglucan Foams**, Nano Center Annual conference (Dead sea, Israel) Jul. 2017
2. **Direct cryo writing of aerogels inspired by the plant cell wall by 3D printing of aligned cellulose nanocrystals**, ACS Spring 2019 (Orlando, Florida, USA) Apr. 2019
3. **3D printed wood**, ACS Spring 2019 (Orlando, Florida, USA) Apr. 2019
4. **Additive Manufacturing of 3D Wooden Structures**, IMEC 2021 (Jerusalem, Israel) Dec. 2021
5. **3D printed wood**, Annual Student Conference of the Faculty of Agriculture Food and Environment (Rehovot, Israel) Feb. 2022
6. **3D Printed Resilin**, Nano Center Annual conference (Dead sea, Israel) Mar. 2022
7. **Wood warping by 3D printing**, ACS Fall 2022 (Chicago, Illinois, USA) Aug. 2022
8. **Wood warping by 3D printing**, 5th EPNOE Junior Scientist Meeting 2022 (Aveiro, Portugal) Sep. 2022

Poster presentations

1. **Understanding the role of cellulose nanocrystal (CNC) surface charge on rheology and chirality**, Nano Center Annual conference (Kibbutz Hagoshrim, Israel) Apr. 2016
2. **Cellulose nanocrystals for 3D printed objects**, Materials 4.0 (Dresden, Germany) Sep. 2017 (Best poster award)
3. **Plant cell wall bioinspired Direct Cryo Writing 3D printing**, NanoIL 2018 (Jerusalem, Israel) Oct. 2018
4. **Additive manufacturing of wood**, ACS Spring 2019 (Orlando, Florida, USA) Apr. 2019 (CELL division selection for Sci-Mix)

5. **Extrusion-based 3D printing of hydrogels with TPO water-soluble photoinitiator and cellulose nanocrystals as a rheological modifier**, NanoIL 2021 (Jerusalem, Israel) Oct. 2021
6. **TPO nanoparticle as water-soluble photoinitiator and CNC as a rheological modifier for extrusion-based 3D printing technique**, ACS Fall 2022 (Chicago, Illinois, USA) Aug. 2022 (CELL division selection for Sci-Mix)
7. **Elimination of the height limit for extrusion-based 3D printed hydrogels by rapid photopolymerization**, 5th EPNOE Junior Scientist Meeting 2022 (Aveiro, Portugal) Sep. 2022
8. **3D objects composed of 100% proteins by two-photons printing (TPP)**, ICAM2023 (Ramat Gan, Israel) Mar. 2023
9. **3D objects composed of 100% proteins by two-photons printing**, Biomaterials: From Basic Science of Nature's Material Design to the Biotech Industry (Rehovot, Israel) Jun. 2023 (Best poster award)