17 August 2025

Mirit Sharabi

Senior Lecturer

Department of Mechanical Engineering & Mechatronics, Ariel University

PERSONAL DETAILS

Date and place of birth: 18/6/1982, Israel

Address and telephone number at work: Ariel University, Ariel, 03-6453159

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EDUCATION AND TRAINING

Undergraduate and Graduate Studies

Ph.D. **2013-2018** - Tel-Aviv University – Material Science and Engineering

Advisors: Prof. Rami Haj-Ali & Prof. Dafna Benayahu

Title: "Novel bio-composite materials and constructs based on unique collagen fibers for soft tissue bio-mimetics".

M.Sc. **2010-2013**- Tel-Aviv University – Nanotechnology and Materials Engineering

Advisors: Prof. Rami Haj-Ali and Prof. Abdussalam Azem

Title: "Novel bio-composite material system from marine long collagen fibers: design, fabrication and mechanical characterization"

B.Sc. **2004-2008** - Ben Gurion University, Biotechnology Engineering

Post-Doctoral Fellowship

Postdoctoral Fellow **2/2018-10/2018**. The Department of Materials and Interfaces,

Weizmann Institute of Science, Israel. Advisor: Prof. Daniel Wagner

PROFESSIONAL APPOINTMENTS

Tenure	Ariel University	7/2023-Present
Senior Lecturer	Ariel University	2/2023-Present
Vice head of department	Ariel University	10/2022-Present
Head of the department teaching committee	Ariel University	10/2022-Present
Lecturer	Ariel University	10/2018-2/2023
Graduate Research Assistant	Tel-Aviv University	2013-2018

HONORS AND AWARDS

2025- Kraus Family Award for excellence in science for 2024, Ariel University (2nd place).

2023- Spineweek Australia – Best research award with Prof. Javad Tavakoli. Melbourne, Australia. New findings pave the way: Structure-function characterization of the transition zone in the intervertebral disc

2017 - ICNB 2017-Best presentation award for the presentation: “Novel bio-composite materials and constructs based on unique collagen fibers for soft tissue bio-mimetics", Amsterdam, Netherlands.

2017- Travel scholarship for an international conference, Ministry of Science, Technology, and Space, Israel

2016 - Travel scholarship for an international conference, Ministry of Science, Technology and Space, Israel

2014 - COMPO-2014- Best Poster Award for the poster "A new class of bio-composite materials with soft-coral long collagen fibers"

2004 - Outstanding undergraduate student award.

RESEARCH SUPPORT

PI ERC parallel-starter grant (MOST) Grant No. 0008243 Using Reverse Biomimetics to Develop a Soft, Programmable, Multimodal Composite Material for Biomedical Applications, Total amount $ 441176 (1.5M ILS). 2025-2029.

PI Israel Science Foundation (ISF) (with Braude College) Grant No. 1424/22 Project title: Structural biomimetics of the intervertebral disc interfaces towards disc regeneration: lessons by reverse engineering. Total amount $ 317647(1.08M ILS), 2022-2026

Co-PI MOST Israel-Italy (with Prof. Haj-Ali, TAU, and Prof. Libonati, IT) Project title: BIOmimetic Novel soft and smart CompositeS (BIONiCS). Total amount $ 100000 ($50000), 2023-2025

Internal support

PI Bio-convergence -Ariel University (with Prof. Javad Tavakoli). Project title: Biomimetics of the Interplay Between Annulus Fibrosus and Nucleus Pulposus within the Spinal Disc, Total amount ILS 50000, 2023-2024

PI Internal -Ariel University. Project title: Reverse biomimetics of the meniscus, Total amount ILS 20000, 2019-2021-2023, Total amount ILS 20000, 2019-2021-2023

PI Gender Equality-Ariel University. Project title: Biomimetics of the IVD, Total amount ILS 20000, 2019-2020

POSITIONS IN CONFERENCES

2023- Scientific committee. Innovation inspired by nature - academia and industry. Tel Aviv, Israel.

2021- Chair and scientific committee. The 19th Israel Materials Engineering Conference (IMEC 2021), Jerusalem, Israel.

2018- Chair. Israel Society for Medical and Biological Engineering (ISMBE 2018), Haifa, Israel.

MANUSCRIPTS REVIEWER

2025- Scientific reports

2025- Bioactive materials

2025 -Materials & design

2021-2025 Mechanical behavior of biomedical materials.

2020-2025 -Acta Biomaterialia.

2022- Advanced science.

2022- Advanced fiber materials

2018-2021- European Spine Journal.

2020- Injury.

Membership in professional/scientific societies

2017-2025 - European Society of Biomechanics (ESB)

INVITED TALKS AND LECTURES(*)

1. Sharabi M. Jerusalem, Israel, “Structural Motifs in Soft Fibrous Tissues: Unraveling Structure-Mechanics Relationships to Inspire Biomimetic Material Design”. 20th Israel Materials Engineering Conference (IMEC20), Israel, 2025
2. Sharabi M. Tel Aviv, Israel, “What can we learn from nature’s soft composite materials?” IPPS50- the 50th Conference of The Israeli Polymers and Plastics Society. *Invited*. Tel Aviv, Israel, 2024
3. Sharabi M. Tel Aviv, Israel, “Biomimetics of soft materials: Structure- Mechanical function relationship from human tissues to plants” Innovation inspired by nature - academia and industry. *Invited*. Tel Aviv, Israel, 2023
4. Sharabi M. Tel Aviv, Israel, “Structural mechanisms in nature-based materials and tissues structure-function relationship” Israel Society for Theoretical and Applied Mechanics (ISTAM 2021). *Invited*. Tel Aviv, Israel, 2021
5. Sharabi M., "Structure-function in bone: numerical simulations" The European Calcified Tissue Society conference (ECTS 2019), Budapest, Hungary, 2019. *Invited*.
   (*) Due to the COVID pandemic and the war in Israel, many other lectures were cancelled.

SUPERVISION OF RESEARCH STUDENTS

	Year of graduation	Name of student	Degree	University
1	2027	Haim Mordechai	PhD	AU
2	2027	Adi Aharonov	PhD	AU
3	2027	Smadar Sharon	PhD	AU
4	2027	Dekel Maroz	PhD	AU
5	2026	Yana Portnov	M.Sc.	AU
6	2025	Yotam Haim	M.Sc.	AU
7	2023	Gital Steinberg	M.Sc.	AU
8	2022	Haim Mordechai	M.Sc.	AU
9	2022	Adi Aharonov	M.Sc.	AU
10	2022	Smadar Sharon	M.Sc.	AU
11	2020	Maya Karnibad	M.Sc.	AU+TAU

PEER-REVIEWED PUBLICATIONS

All Publications

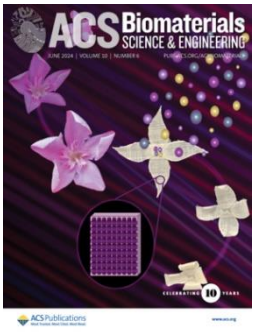
Scientific Publications H-index-14, i10-index-16, Total citations -583

1. **Sharabi M.** (2025) Structural Motifs in Soft Fibrous Tissues: Revealing Structure-Mechanics Relationships in Deformation and Tear Resistance for Biomimetic Material Design. Advanced Healthcare Materials. *Accepted*. Journal IF 10.0, Q1.

2. Vieira, L., Mordechai, H. S., **Sharabi, M.,** Tipper, J. L., & Tavakoli, J. (2024). Stress relaxation behavior of the transition zone in the intervertebral disc. Acta Biomaterialia. https://doi.org/10.1016/j.actbio.2024.09.032.. Journal IF 9.9, Q1.

3. Aharonov, A., Sofer, S., Bruck, H., Sarig, U., & **Sharabi, M**. (2024). Unveiling the Mechanical Role of Radial Fibers in Meniscal Tissue: Toward Structural Biomimetics. *Acta Biomaterialia*. https://doi.org/10.1016/j.actbio.2024.08.024. Journal IF 9.9, Q1.

4. Musenich, L., Berardengo, M., Avalle, M., Haj-Ali, R., **Sharabi, M**., & Libonati, F. (2024). Anisotropic mechanical and sensing properties of carbon black-polylactic acid nanocomposites produced by fused filament fabrication. *Smart Materials and Structures*. Journal IF 3.7, Q1.



5. **Sharabi, M.,** Agron, R., Dolev, A., Haj-Ali, R., & Yassin, M. (2024). Predictive Refined Computational Modeling of ACL Tear Injury Patterns. *Bioengineering*, *11*(5), 413. https://doi.org/10.3390/bioengineering11050413, Journal IF 3.8, Q2.

6. Shteinberg G., Haj-Ali R., Libonati F., & **Sharabi M**., (2024) Plant Biomimetic Principles of Multifunctional Soft Composite Development: A Synergistic Approach Enabling Shape Morphing and Mechanical Robustness, *ACS Biomaterials Science & Engineering.* 10 (6), 3707-3717 DOI: 10.1021/acsbiomaterials.3c01163, Journal IF 5.4, Q1.

7. Sharon, S; Aharonov, A; Mordechai, H. S; Tavakoli, J & **Sharabi, M.** (2023) Collagen-based micro/nano fibrous constructs: Step-by-step reverse biomimetics of structure and mechanical function *ACS Applied Polymer Materials.* 5, 4, 2816–2829. Journal IF 4.851, Q1.

8. Mordechai, H. S., Aharonov, A., Sharon, S. E., Bonshtein, I., Simon, C., Sivan, S. S., & **Sharabi, M*.** (2023). Toward a mechanically biocompatible intervertebral disc: Engineering of combined biomimetic annulus fibrosus and nucleus pulposus analogs. *Journal of Biomedical Materials Research Part A*. Journal IF 4.854, Q2.

9. Mirzaeipoueinak, M., Mordechai, H. S., Bangar, S. S., **Sharabi, M**.*, Tipper, J. L., & Tavakoli, J. (2023). Structure-function characterization of the transition zone in the intervertebral disc. *Acta Biomaterialia*. Journal IF 10.633, Q1.

10. Aharonov, A., Mordechai, H. S., Sharon, S. E., & **Sharabi, M.*** (2023). The mechanical behavior of silk-fibroin reinforced alginate hydrogel biocomposites-Toward functional tissue biomimetics. *Journal of the Mechanical Behavior of Biomedical Materials*, 138, 105598. Journal IF 4.042, Q2.

11. Cyril, D., Giugni, A., Bangar, S. S., Mirzaeipoueinak, M., Shrivastav, D., **Sharabi, M.**, Tipper, J. L. & Tavakoli, J.. (2022) Elastic Fibers in the Intervertebral Disc: From Form to Function and toward Regeneration, *International Journal of Molecular Sciences*, 23(16), 8931. Journal IF 6.208, Q1.

12. **Sharabi M.**[#] Structural Mechanisms in Soft Fibrous Tissues: A Review. (2022) *Frontiers in Materials*. Special issue: "Design and fabrication tools for advanced materials: applications in biomechanics and mechanobiology" 8:793647. doi: 10.3389/fmats.2021.793647. *Invited*. Journal IF 3.985, Q2.

13. Frenkel, D.*, Ginsbury E.* & **Sharabi, M.*** The Mechanics of Bioinspired Stiff-to-Compliant Multi-Material 3D-Printed Interfaces, (2022). *Biomimetics.* Special issue: Advances in Biomimetics, *Invited*. 7, (4), 170. Journal IF 4.5, Q1.

14. **Sharabi M.*,** Karnibad M.*, Lavon K., Morany A., Hamdan A. & Haj-Ali R.. The effect of fibrocalcific pathological process on aortic valve stenosis in female patients: a finite element study. *Biomedical Physics & Engineering Express*, (2022). 8(2), 025017. doi.org/10.1088/2057-1976/ac5223. Journal IF 1.4, Q3.

15. **Sharabi M.*,** Wertheimer S.*, Shelah O., Lesman A., & Haj-Ali R.. Bio-Composites Reinforced with Unique Coral Collagen Fibers: Towards Biomimetic-Based Small Diameter Vascular Grafts. *Journal of the Mechanical Behavior of Biomedical Materials* (2021) 104526. doi.org/10.1016/j.jmbbm.2021.104526. Journal IF: 4.042, Q2.

16. Roy, P. K., Shoval, S., **Sharabi, M.,** & Bormashenko, E.. Soft lithography with liquid marbles. *Colloids and Surfaces A: Physicochemical and Engineering Aspects,* (2020) 607, 125488. doi.org/10.1016/j.colsurfa.2020.125488. Journal IF- 4.539, Q2.

17. **Sharabi M.*,** Wagner DH,. Structural biomimetics in soft synthetic composite materials: A proof-of-concept alginate-polyamide soft hierarchical composite. *Express polymer letters*, (2021), 15 (8). doi.org/10.3144/expresspolymlett.2021.59. Journal IF 4.161, Q1.

18. **Sharabi M.*,** Wertheimer S.*, Shelah O., Lesman A., & Haj-Ali R.. Bio-Composites Reinforced with Unique Coral Collagen Fibers: Towards Biomimetic-Based Small Diameter Vascular Grafts. *Journal of the Mechanical Behavior of Biomedical Materials* (2021) 104526. doi.org/10.1016/j.jmbbm.2021.104526. Journal IF: 4.042, Q2.

19. **Sharabi, M**., Wertheimer, S., Wade, K.R., Galbusera, F., Benayahu, D., Wilke, H.J. and Haj-Ali, R., (2019). Towards intervertebral disc engineering: Bio-mimetics of form and function of the annulus fibrosus lamellae. Journal of the Mechanical Behavior of Biomedical Materials, 94, pp.298-307. doi.org/10.1016/j.jmbbm.2019.03.023. Journal IF: 4.042, Q2.

20. **Sharabi, M.,** Levi-Sasson, A., Wolfson, R., Wade, K. R., Galbusera, F., Benayahu, D., Wilke H-J & Haj-Ali, R. (2019). The Mechanical Role of the Radial Fiber Network Within the Annulus Fibrosus of the Lumbar Intervertebral Disc: A Finite Elements Study. Journal of biomechanical engineering, 141(2), 021006. doi.org/10.1115/1.4041769. Journal IF- 2.097. Q3.

21. Sopher, R. S., Tokash, H., Natan, S., **Sharabi, M**., Shelah, O., Tchaicheeyan, O., & Lesman, A. (2018). Nonlinear Elasticity of the ECM Fibers Facilitates Efficient Intercellular Communication. Biophysical journal, 115(7), 1357-1370. doi.org/10.1016/j.bpj.2018.07.036. Journal IF- 4.033. Q1.

22. **Sharabi M.,** Wade K. R., Galbusera F., Rasche V., Haj-Ali R. and Wilke H-J. Three- dimensional microstructural reconstruction of the intervertebral disc using ultra-high field MRI. The spine journal (2018). doi.org/10.1016/j.spinee.2018.06.356. Journal IF- 4.166, Q1.

23. Benayahu D., **Sharabi M.,** Pomeraniec L., Awad L. Haj-Ali R. and Benayahu Y., Unique collagen fibers for biomedical applications. Marine drugs Journal (2018), 16(4), 102. doi.org/10.3390/md16040102 Journal IF- 6.085. Q1. This paper was chosen as the cover story of the journal.

24. **Sharabi M.,** Varssano D., Eliasy R., Benayahu Y., Benayahu D., and Haj-Ali R., Mechanical flexure behavior of bio-inspired collagen-reinforced thin composites (2016), Composite Structures, 153, 392-400. doi.org/10.1016/j.compstruct.2016.06.031. Journal IF-6.603. Q1.

25. **Sharabi M.,** Benayahu D., Benayahu Y., Issacs J., and Haj-Ali R., Laminated Collagen-based bio-composites for tailor designed soft tissue mimetics. Composites Science and Technology (2015), 117, 268-276. doi.org/10.1016/j.compscitech.2015.06.024. Journal IF-9.879. Q1.

26. **Sharabi M.,** Mandelberg Y., Benayahu D., Benayahu Y., Azem A. and Haj-Ali R., A new class of bio-composite materials of unique collagen fibers. Journal of the mechanical behavior of biomedical materials (2014), 36, 71-81. doi.org/10.1016/j.jmbbm.2014.04.008. Journal IF: 4.042, Q2.

Books Chapters

27. **Sharabi M.** Wilke H-J. and Haj-Ali R., 2018, Chapter 5: Vertebral bone. In: Biomechanics of the Spine. pp. 71-87, Editors - Hans-Joachim Wilke and Fabio Galbusera, Publisher – Elsevier.

28. **Sharabi M.** Wade K. R. and Haj-Ali R., 2018, Chapter 7: The role of collagen fibers. In: Biomechanics of the Spine. pp. 105-123. Editors - Hans-Joachim Wilke and Fabio Galbusera, Publisher – Elsevier.

Presentation of papers at conferences/meetings

CONFERENCE TALKS

1. Mirzaeipoueinak, M., Mordechai, H. S., Bangar, S. S., **Sharabi, M**., Tipper, J. L., & Tavakoli. "New findings pave the way: Structure-function characterization of the transition zone in the intervertebral disc", Best Research Award. May 2023, Spineweek Australia, Melbourne, Australia.
2. **Sharabi M.** "Structural mechanisms in soft fibrous tissues: lessons from biomimetics". European Society of Biomechanics (ESB2022), Porto, Portugal, 2022.
3. **Sharabi M.** and Haj-Ali R. "Bio-mimetic soft composite materials and structures", Mechanics of Biomaterial and Tissues (MOBT 2019), Waikoloa Beach, Hawaii, USA, 2019.
4. **Sharabi M.** and Haj-Ali R., "Computational simulations for engineering of biomimetic soft tissue structures using ultra-long collagen fibers" 16th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering and the 4th Conference on Imaging and Visualization (CMBBE 2019), New- York, USA, 2019.
5. **Sharabi M.**, Benayahu D., and Haj-Ali R. "Novel bio-composite materials and constructs based on unique collagen fibers for soft tissue bio-mimetics", International Conference on Nanomaterials and Biomaterials (ICNB 2017), Amsterdam, Netherlands, 2017.
6. **Sharabi M.**, Benayahu D., and Haj-Ali R. "Long collagen fibers reinforced bio-composites for tailor-designed mechanical behavior of soft tissues". European Society of Biomechanics (ESB 2017), Seville, Spain, 2017.
7. **Sharabi M**., Benayahu D., Benayahu Y., and Haj-Ali R. Long collagen fibers reinforced bio-composite laminates and constructs, 2nd International Conference on Mechanics of Composites, University of Porto, Porto, Portugal, 2016
8. **Sharabi M.**, Benayahu D., and Haj-Ali R. Collagen fiber bio-composite laminates and constructs. 5th International Conference "Smart and Multifunctional Materials, Structures and Systems" (CIMTEC 2016), Perugia, Italy, 2016.
9. **Sharabi M.**, Benayahu D., Benayahu Y., and Haj-Ali R. Mechanical behavior of soft bio-composite laminated constructs. The 17th Israel materials engineering conference, (IMEC17), Ramat-Gan, Israel, 2016.
10. **Sharabi M.**, Varssano D., Benayahu D., Benayahu Y., and Haj-Ali R. Cornea bio-inspired constructs based on oriented long collagen fibers bio-composites. The 25th Congress of the International Society of Biomechanics (ISB2015) Glasgow, Scotland, 2015.
11. **Sharabi M.**, Benayahu D., Benayahu Y., and Haj-Ali R. A new class of bio-composite materials with soft-coral long collagen fibers. The Israel Society for Medical and Biological Engineering conference (ISMBE2015) Haifa, Israel, 2015.
12. **Sharabi M.** and Haj-Ali R. Biocomposite materials of unique collagen fibers, ICME 2012, Tel-Aviv University, Israel, 2012.
13. **Sharabi M.**, Benayahu D. and Haj-Ali R. Biocomposite materials of unique collagen fibers, 2nd TAU Biophysics students conference, Nazareth, Israel, 2012.

CONFERENCE POSTERS

1. Sofer S., Aharonov A. **Sharabi M.** and Sarig U. Print-Pause-Bioprint: Developing a 'Quick and Dirty' Multi-Material DLP Bioprinting Method that Instantly Interfaces Microfluidics with Bioprinted Tissues, Advances in 3D Bi-printing, Technion, Haifa, Israel. September 2023
2. **Sharabi M**., "Biomimetics of structural motifs in soft Fibrous tissues". CMBBE2023, Paris, France, May 2023.
3. Aharonov A. & **Sharabi M.** "Biomimetics of the meniscus tissue: structure and function relationship", CMBBE2023, Paris, France, May 2023.
4. Shteinberg G. & **Sharabi M.** "Morphing in plant tissues: biomimetics of structure and function". CMBBE2023, Paris, France, May 2023.
5. Levy A. and **Sharabi M.** Morphing in soft composite materials for biomedical applications. Israel Society for Medical and Biological Engineering (ISMBE 2019), Haifa, Israel, 2019.
6. Hazan S., Idan R., Wertheimer S., Haj-Ali R., Avrahami I, and **Sharabi M.** New flow system for compliance testing of collagen fibers reinforced bio-composites for small-diameter tissue engineered blood vessels. Israel Society for Medical and Biological Engineering (ISMBE 2019), Haifa, Israel, 2019.
7. Wertheimer S., Shelah O., **Sharabi M.**, Lesman A., and Haj-Ali R. Bio-composites based on unique coral collagen fibers towards tissue-engineered bold-vessels. Israel Society for Medical and Biological Engineering (ISMBE 2019), Haifa, Israel, 2019.
8. Sopher R. S., Tokash H., Natan, S., **Sharabi M.,** Shelah O., Tchaicheeyan O., and Lesman A., Nonlinear Elasticity of the fibers contained in the ECM Facilitates Efficient Inter-Cellular Mechanical Signaling, Israel Society for Medical and Biological Engineering (ISMBE 2019), Haifa, Israel, 2019.
9. **Sharabi M.** and Wagner DH, Bio-mimetics of Structural Micro-mechanisms in Soft Composite Materials, Architectured Material Mechanics (AMM), IUTAM, Chicago, IL, USA, 2018.
10. **Sharabi M.,** Wertheimer S., Shelah O., Haj-Ali R. and Lesman A., Bio-composites Based on Coral Collagen Fibers for Tissue Engineering, Israel Society for Medical and Biological Engineering (ISMBE 2018), Haifa, Israel, 2018
11. Sopher R. S., Tokash H., **Sharabi M.,** Tchaicheeyan O., and Lesman A., Nonlinear Elasticity of Biological Fibrous Networks Facilitates Efficient Inter-cellular Mechanical Signaling, Israel Society for Medical and Biological Engineering (ISMBE 2018), Haifa, Israel, 2018
12. Mann A., Koren Y., Sopher R., **Sharabi M.** and Lesman A. Computational modeling of cell-matrix and cell-cell interactions. Frontiers in single molecule biophysics meeting 2017, Neve Ilan hotel, Israel, 2017.
13. **Sharabi M.**, Benayahu D., and Haj-Ali R. Novel biocomposite materials and constructs based on unique collagen fibers for soft tissue bio-mimetics. MOST Conference, Tel-Aviv, Israel, 2017
14. **Sharabi M.**, Awad L., Benayahu Y., Haj-Ali R. and Benayahu D., A bio-composite based on long collagen fibers scaffold for mimicking intervertebral disc structure, Israel Society of Skeletal Biology and Medicine (ISSBM), Tel-Aviv, Israel, 2016.
15. **Sharabi M.**, Haj-Ali R., Non-Destructive Piezo-resistive Testing Devices for Self-Health Damage Monitoring of Composite Structures, Industrial Affiliates Program (IAP 2016), Tel-Aviv, Israel, 2016.
16. **Sharabi M.**, Benayahu D., Benayahu Y., and Haj-Ali R. A new class of bio-composite materials with soft-coral long collagen fibers. The Israel Society for Medical and Biological Engineering conference (ISMBE2015) Haifa, Israel, 2015.
17. **Sharabi M.**, Benayahu D., Benayahu Y., and Haj-Ali R. A new class of bio-composite materials with soft-coral long collagen fibers. Nanocomposites & Biocomposites (COMPO2014) Rehovot, Israel, 2015.

Patents

1. Sharabi M., Aharonov A., Mordechai HS., Sharon ES, BIOMIMETIC SOFT COMPOSITE ORTHOPEDIC IMPLANTS HAVING RADIAL FIBERS. PCT/IL2025/050172 filed 19 February 2025, claiming priority from U.S. Provisional Patent Application No. 63/555,964 filed 21 February 2024.
2. Haj-Ali R., Benayahu Y., Benayahu D., Sason-Levi A., **Sharabi M.** Composites comprising collagen extracted from sarcophyton sp. Coral US9821089B2, US Grant (2017)
3. Haj-Ali R., Benayahu Y., Benayahu D., Sason-Levi A., **Sharabi M.** Composites comprising collagen extracted from sarcophyton sp. Coral EP2812039B1, EP Grant (2018).