Gaddi Blumrosen – Full CV

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About

Gaddi Blumrosen is a multi-disciplinary scientist, deploying advanced computational tools (signal processing, modeling, and machine learning) to develop new sensing, modeling, and data analysis tools in medicine, neuroscience, and biological processes understanding.
Currently I am a Principal Investigator (PI) and the head of my current lab having more than 14 graduate students, working on state-of-the-art research project in the field of multi-modal (video, voice, and test) processing of video stream for neurological diagnosis of neurological disorders like ADHD, Autism, Parkinson disease, and Dementia. I work in collaboration with leading hospitals in Israel like Sheba (neurology department), Ichilov (neurology and geriatric department), and Beilinson (ophthalmology), and occupational therapy at Haifa University, psychological department at Ariel University, and biomedical department at Bar Ilan University.
In recent years, my focus has been on finding behavioral biomarkers related to motor and cognitive changes in the mental field, specifically in ADHD, Autism, Alexithymia, Dementia, and Parkinson's disease. My aim is to improve the accuracy of diagnoses, close the diagnosis-treatment loop, and assist the patient, their family members, and their environment

Research interest

Machine learning, signal processing, Activity recognition, Exploit Home based sensing (inertial sensors, video) for advancing medical and neurological diagnostics; Computational Neuroscience; Bio-Inspired Systems' design.

Medical sensing and diagnostics lab

He is the head of medical sensing and diagnostics lab: https://gaddib.wixsite.com/hit-site/

The lab deploys and develop state of the art machine learning tools focusing on available home resources like video and tablets to extract behavioral features that can assist in medical diagnosis, and in decision support for clinicians, focusing mostly in diagnosis of neurological condition at home environment settings.

Education

Gaddi has BsC, MA, and PhD from Technion, Tel aviv University, and School of Computer Science and Engineering, Hebrew University of Jerusalem (2012).

Positions, Scientific Appointments, and Honors

2024-2025 Special issue editor, Wearable Sensing of Medical Condition at Home Environment
2021- Tenured Senior Lecturer, Dept. of Digital Medical Technologies, and school of Computer and data science, Holon Institute of Technology (HIT)
2022- Head of Medical sensing and Analysis laboratory, Holon Institute of Technology (HIT)

2020-2021 Lecturer, Statistics and Machine learning, MsC program in environmental studies, Tel Aviv University
2019-2021 Associate researcher, Faculty of Engineering and Gonda school of neuroscience, Bar Ilan University
2015-2016- cancer research at Harvard medical school

2016-2018 Research associate, Computational Medicine, IBM research, New York, United States

Grants

Working Grants:
1. HIT-Haifa grant for application for ADHD diagnostics (2022-2024).
2. Israeli cancer foundation, decision support tools for precision medicine in cancer (with BIU, 2022-2023)
3. HIT-Ariel grant for analyzing Autism based on mother-child interaction (2023-2025)

Past Grants
:1.Leibniz Fellowship, School of Engineering and Computer Science, The Hebrew University of Jerusalem (2010-11);
2. Valachi Pikovsky Foundation post-doctoral fellow (2012);
3. Parkinson Diseases, SAIA research grant (2013);
4. Israel Cancer Association (ICA), travel grant (2014) ;
5. Eshkol post-doctoral fellowship (2013-2015); 6. IBM research post-doctoral fellowship (2016-2018)

Teaching

Decision support system in medicine, MsC, computer science, HIT

Data analysis and decision support system, MsC, faculty of data science, HIT

Sensing, monitoring, and medical condition assessment at home environment, BA, faculty of digital medical technologies, HIT

Machine learning, BA, faculty of digital medical technologies, HIT

2021, Introduction to Statistics and machine learning , Tel Aviv University

Selected Publications

Google scholar link: **https://scholar.google.co.il/citations?user=kiDmFw0AAAAJ&hl=en**

[]* - equal contribution

Medical Data Modeling and Diagnosis

1. **Anton Gellashvili, Hezi Reshef, and Gaddi Blumrosen, "ADHD diagnostics from home-based video clips", translational psychiatry, nature, under review**
2. **Harel Rom, Ori Peleg, Yovel Rom, Anat Mirelman, Gaddi Blumrosen, and Inbal Maidan," Home-based assessment of Parkinson's disease severity with facial video recording", Artificial Intelligence In Medicine, submitted, under review (August 2024)**
3. **Anton Gellashvili, Hezi Reshef, and Gaddi Blumrosen, "Construction of a Social-Media Based Clinical Database – Roadmap, Challenges, and Feasibility for ADHD Recognition", IEEE access, (2024)**

4. **Varon, Eli*, Gaddi Blumrosen*, and Orit Shefi. "A predictive model for personalization of nanotechnology-based phototherapy in cancer treatment." Frontiers in Oncology 12 (2023): 1037419.**
5. **Varon, E., Blumrosen, G., Sinvani, M., Haimov, E., Polani, S., Natan, M., ... & Shefi, O. (2022). An engineered nanocomplex with Photodynamic and Photothermal synergistic properties for cancer treatment. International Journal of Molecular Sciences, (2022), 23(4), 2286.**
6. **Lazebnik, Teddy*, and Gaddi Blumrosen*. "Advanced multi-mutation with intervention policies pandemic model." IEEE Access 10 (2022): 22769-22781.**
7. **An engineered nanocomplex with Photodynamic and Photothermal synergistic properties for cancer treatment**
   Eli Varon, Gaddi Blumrosen, Moshe Sinvani, Elina Haimov, Shlomi Polani, Michal Natan, Irit Shoval, Ayel et Atkins, David Zitoun, Orit Shefi,
   bioRxiv 2021.12.08.471725; doi: https://doi.org/10.1101/2021.12.08.471725
8. **Blumrosen, G, Yonatn Wexler, Doron Shkolnik, and Alex Golberg. The 20th annual IEEE International Conference on Bioinformatics and Bioengineering. To apear in the Proceedings of IEEE BIBE, October 2020**
9. **Blumrosen, G. (2019b). Enhancing Healthcare Quality with Reinforcement Learning Modeling. Proceedings of IEEE Sensors, 2019-Octob. https://doi.org/10.1109/SENSORS43011.2019.8956903, . (2019).**
10. **Yaron Lavi, Dror Birnbaum, Or Shabtai, Gaddi Blumrosen , "Bio-Metric System based on Kinect Skeleton, Facial, and Vocal Features",** Advances in Intelligent Systems and Computing, Springer, 2018.
11. **Gaddi Blumrosen, David Hawellek, and Bijan Pesaran, "Towards Automated Recognition of Facial Expressions in Animal Models Blumrosen",** Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition, pp. 2810--2819, 2017 .
12. **Blumrosen, G*., Abazari, A*., Golberg, A., Yarmush, M. L. & Toner, M. Single-step electrical field strength screening to determine electroporation induced transmembrane transport parameters.** Biochim. Biophys. Acta - Biomembr. 1858, 2041–2049 (2016).
13. **Amichai, E*., Blumrosen, G*. & Yovel, Y. Calling louder and longer: how bats use biosonar under severe acoustic interference from other bats.** *Proc. R. Soc. B* 282, 20152064 (2015).
14. **Khan, Saiqa I*; Blumrosen, Gaddi*; Vecchio, Daniela*; Golberg, Alexander; McCormack, Michael C.; Yarmush, Martin L.; Hamblin, Michael R.; Austen, W. G. . Eradication of multidrug-resistant pseudomonas biofilm with pulsed electric fields.** *Biotechnol. Bioeng.* n/a–n/a. doi:10.1002/bit.25818 (2015)
15. **Blumrosen, G*., Abazari, A*., Golberg, A., Tonner, M. & Yarmush, M. L. Efficient Procedure and Methods to Determine Critical Electroporation Parameters.** in *2014 IEEE 27th International Symposium on Computer-Based Medical Systems* 314–318 (IEEE, 2014). doi:10.1109/CBMS.2014.18, *2014*
16. **Blumrosen, Gaddi;Porrat, Dana;Rubinsky, Boris; Dolev, D. Exploitation of electromagnetic radiation properties for medical diagnostic. in** *2011 IEEE International Conference on Microwaves, Communications, Antennas and Electronic Systems (COMCAS 2011)* 1–7 (IEEE, 2011). doi:10.1109/COMCAS.2011.6105853, *2011*
17. **Gonzalez, C. a., Blumrosen, G. & Rubinsky, B. Remote Monitoring of Internal Bleeding Based on Magnetic Induction and Cellular Phone Technology : A Potential Application in Poor Regions in México.** *Comput. y Sist.* 14, 187–195 (2010).
18. **Blumrosen, G., Gonzalez, C. a. & Rubinsky, B. New wearable body sensor for continuous diagnosis of internal tissue bleeding.** *Proc. - 2009 6th Int. Work. Wearable Implant. Body Sens. Networks, BSN 2009* 120–124. doi:10.1109/BSN.2009.15, (2009)

Human Motion and Activity Acquisition

1. Blumrosen, G., Sakuma, K., Rice, J. J., & Knickerbocker, J. Back to Finger-Writing Fingertip writing technology based on pressure sensing. IEEE Access, 1–1. https://doi.org/10.1109/ACCESS.2020.2973378 (2020)
2. Katsuyuki, S., Blumrosen, G., Rice, J. J., Rogers, J., & Knickerbocker, J. (n.d.). Turning the Finger into a Writing Tool. IEEE EMBS 2019.
3. Katsuyuki Sakuma, Avner Abrami, Gaddi Blumrosen, Stanislav Lukashov, Rajeev Narayanan, Joseph W. Ligman, Vittorio Caggiano & Stephen J. Heisig **"Wearable Nail Deformation Sensing for Behavioral and Biomechanical Monitoring and Human-Computer Interaction",** scientific reports, December 2018
4. Blumrosen, G, Miron, Y, Intrator, N, and Plotnik, M,"**A Real Time Kinect Signature Based Patient Kinemetics Analsyis At Home**", *Sensors 2016, 16(11), 1965; doi: 10.3390/s16111965, 11/2016*.
5. Blumrosen, G, Miron, Y, Plotnik, M, and, Intrator, N, "**Towards a real time kinect signature based human activity assessment at home**." *2015 IEEE 12th International Conference on Wearable and Implantable Body Sensor Networks (BSN)*. IEEE, 2015.
6. Blumrosen G, Fishman B, Yovel Y: **Non-contact Wideband Sonar for Human Activity Detection and Classification**. IEEE, Sensors, 2014.
7. Blumrosen G, Luttwak A: **Human body parts tracking and kinematic features assessment based on RSSI and inertial sensor measurements**. *Sensors* 2013, **13**(9):11289-11313, 2013.
8. Blumrosen G, Uziel M, Rubinsky B, Porrat D: **Noncontact Tremor Characterization Using Low-Power Wideband Radar Technology**. *Biomedical Engineering, IEEE Transactions on* March, 2012, **59**(3):674-686.
9. Blumrosen G, Avisdris N, Kupfer R, Rubinsky B: **C-SMART: Efficient Seamless Cellular Phone Based Patient Monitoring System**. *Proccedings of IEEE IREHSS 2011 : Third IEEE Workshop on Interdisciplinary Research on E-health Services and Systems* 2011.
10. Blumrosen G, Uziel M, Rubinsky B, Porrat D: **Non-Contact UWB Radar Technology to Assess Tremor**. *The 12th Mediterranean Conference on Medical and Biological Engineering and Computing Proceedings* 2010.

Wireless communication and wireless Sensor Network

1. Blumrosen, G. **Enhancing Tracking Accuracy with Exploitation of Mobile Unit Orientation and Antenna Pattern. 1–6.** https://doi.org/10.1109/comcas44984.2019.8958436 (2019)
2. Blumrosen, G*., Hod, B*., Anker, T., Dolev, D. & Rubinsky, B. **Enhanced calibration technique for RSSI-based ranging in body area networks.** Ad Hoc Networks 11, 555–569 (2013).
3. Blumrosen, G*., Hod, B*., Anker, T., Dolev, D. & Rubinsky, B. **Enhancing RSSI-based tracking accuracy in wireless sensor networks. ACM Trans. Sens. Networks 9, 1–28 (2013).**
4. Blumrosen, G., Hod, B., Anker, T., Dolev, D. & Rubinsky, B. **Continuous Close-Proximity RSSI-Based Tracking in Wireless Sensor Networks.** in 2010 International Conference on Body Sensor Networks 234–239 (IEEE, 2010). doi:10.1109/BSN.2010.36 (2010)
5. Blumrosen, G. & Fridman, V. **Simple ML optimal transmission for OSTBC combined with beamforming in Rayleigh and Rician channels.** 23rd IEEE Conv. Electr. Electron. Eng. Isr. 88–91 (2004). doi:10.1109/EEEI.2004.1361095 2004
6. Blumrosen, G. & Freedman, A. **Sensitivity Study and a Practical Algorithm for ML OSTBC and Beamforming Combination. in (IST),** 2004**.**

***Equal contribution**

Patents (published or provisional)

1. Sakuma, Katsuyuki, Stephen J. Heisig, John J. Rice, John Knickerbocker, and Gaddi Blumrosen. "Writing recognition using wearable pressure sensing device." U.S. Patent 10,878,231, issued December 29, 2020. https://patents.google.com/patent/US10878231/en
2. Sakuma, K., Heisig, S.J., Rice, J.J., Knickerbocker, J. and Blumrosen, G., International Business Machines Corp, 2020. *Writing recognition using wearable pressure sensing device*. U.S. Patent 10,878,231. https://patents.google.com/patent/US10878231/en

3. Blumrosen, G., Fishman, B. and Yovel, Y., 2014. *Method and system for activity detection and classification*. U.S. Patent Application 14/210,972. https://patents.google.com/patent/US20140266860A1/en
4. Blumrosen, G., Kolpakov, A., and Tyomkin, B.. "System apparatus and method of classifying bio-mechanic activity." U.S. Patent Application 17/321,532, filed September 29, 2022. https://patents.google.com/patent/US20220309366A1/en
5. Blumrosen, G., "posture device detection and system", WO2021255740A1, 2021-12-23 WO2021255740A1.pdf (storage.googleapis.com)
6. "Daily life tools for assessment of neurological disease severity", August 2024, submitted

Selected Conferences and Invited talks

1. **July 2024 -** Alexithymia evaluation with Artificial Intelligence models: roadmap an feasibility, Porto
2. **May 2024,** Alexithymia evaluation with Artificial Intelligence models, **ARIA WORKSHOP**
3. **2019** Enhancing Healthcare Quality with Reinforcement Learning

Popular Science publications and public lectures

1. The future of Wimax, http://thefutureofthings.com/articles/6361/the-future-of-wimax.html
2. "Relationship between art and technology", Bezalel, Hebrew University of Jerusalem
3. "What we can learn from bats", https://www.limmudtlv.org/bats-who-are-they-and-what-can-we-learn-from-them/

Academic service (reviewer)

Review link: https://www.webofscience.com/wos/author/record/J-6778-2019

- **Wireless sensors and communication journals**: IEEE Transaction on Wireless Communication, Springer Mobile Networks and Applications, IEEE transactions on mobile computing, the Journal of Selected Topics in Signal Processing, Indian Journal of Computer Science and Engineering, IEEE Transactions on Microwave Theory and Techniques, Mobile network and applications
- **Bio-medical and sensing journals:** IEEE Transaction on Biomedical Engineering, IEEE sensors, sensors (http://www.mdpi.com/sensors), Springer Computers in Biology and Medicine, Elsevier Biomedical Signal Processing & Control, IEEE Journal of Biomedical and Health Informatics, Elsevier Computer Methods and Programs, IEEE Transactions on Neural Systems & Rehabilitation Engineering, healthcare (mdpi), symmetry (mdpi), IEEE access
- **Bio-medical and sensing conferences:** IEEE UAV2010, IEEE eusipco2011.
- **Editorial stuff, Topic editor, sensors journal**