

PhD and Postdoctoral Positions in the Bar-Shir Lab, Weizmann Institute of Science, Israel.

Would you like to develop novel tools for molecular imaging of the brain? Are you interested in designing reporter proteins or small responsive sensors to allow mapping, using MRI, brain physiology and pathology? Full-time postdoctoral positions are available in the lab of Dr. Amnon Bar-Shir at the Weizmann Institute of Science.

Our lab develops multidimensional molecular toolbox for MRI by combining (i) synthetic chemistry of responsive agents, (ii) engineering reporter gene for multiplexed mapping of gene expression and (iii) brain-delivering carriers based on genetically modified extracellular vesicles. Such a toolbox provides with a unique capability to map multifaced biological targets, non-invasively and longitudinally, using single imaging modality (MRI).

Specifically, the complex role of metal ions, in health and disease, requires not just the ability to spatially map their dynamic levels but also necessitates complementary imaging tools to noninvasively monitor the expression of related genes that are upregulated upon changes in the ions levels. This calls for novel strategies and developed technologies for monitoring metal ions, while in their native biological milieu (i.e., *in vivo*), by exploiting cutting-edge imaging setups and the knowledge in synthetic chemistry and biological engineering.

Our very recent studies show the applicability of our approaches.

In a paper published in **Nature Biotechnology 2021** <https://www.nature.com/articles/s41587-021-01162-5> we have shown the design and implementation of a novel approach for noninvasive multiplex MRI mapping of transgene expression. We envision that the ability to map several transgenes that are simultaneously expressed using MRI could be combined with other capabilities of this technique to obtain a single platform with which to study biological complexity at anatomical, cellular and molecular levels.

In another paper, in **J Am Chem Soc 2021** <https://pubs.acs.org/doi/abs/10.1021/jacs.1c05376>, we have demonstrated the development of MRI approach for mapping labile Zn^{2+} in the brain. By developing synthetic probes to obtain a significant enhancement of MRI signal amplifications without affecting ion specificity this approach has opened new avenues for the design of additional probes for other metal ions beyond Zn^{2+} .

We also develop novel strategies for molecular and cellular MRI with an aim to enrich the capabilities of this modality with features that are not yet accessible:

(i) nanofluorides

<https://www.nature.com/articles/s41467-020-20512-6>

<https://pubs.acs.org/doi/abs/10.1021/acsnano.1c01040>

(ii) supramolecular systems

<https://www.nature.com/articles/s41467-021-23179-9>

<https://onlinelibrary.wiley.com/doi/full/10.1002/ange.202100427>

Highly motivated and creative applicants (PhD or MD) who are looking for freedom to develop groundbreaking strategies and innovative ideas in the field of molecular and cellular imaging are encouraged to apply. Our lab provides with the needed cutting-edge technologies including the state-of-the-art ultrahighfield 15.2 T MRI scanner for *in vivo* implementation of the developed technologies. Successful applicants will be independent to lead their projects with an option to supervise graduate students as part of their effort to pursue multi-components project. Prior experience in one or more related fields such as molecular biology genetic engineering, synthetic chemistry, *in vivo* imaging, neurobiology and MRI is an advantage.

The Weizmann Institute of Science has an unusually diverse community of postdoctoral scholars from all around the world (<https://www.weizmann.ac.il/feinberg/postdoctoral-training-weizmann-institute>).

Successful candidates will be eligible to apply for: on-campus housing, postdoctoral excellence fellowship, airfare support (for internationals), family assistance, and visa & medical insurance. A support to attend international conferences in a related field will be offered and postdocs will be encouraged to present their work.

The Weizmann Institute of Science has been recently ranked eighth globally for research quality in a weighted (proportional) ranking, i.e., "Leiden Ranking". As such, the institute scientists are advancing research in a variety of fields ranging from neurobiology to cancer and microbiology to materials science and physics. Thus, considerable opportunities for collaboration and multidisciplinary connections are readily available.

If you are interested in joining us, please contact amnon.barshir@weizmann.ac.il and attached your CV and a cover letter