HIGHLIGHT MISROCK FOUNDATION PAVES THE WAY FOR A SUCCESSFUL CAREER

Sai Reddy’s professorship was only made possible through the generous funding by the Foundation of S. Leslie Misrock, starting in 2010. Last year, Misrock Foundation increased its initial commitment for the second time. Since he started at ETH Zurich, Professor Sai Reddy achieved a large number of outstanding and highly recognized publications, presented his studies at more than 30 talks and applied for four patents. His contributions attracted keen interest beyond the academic community, leading to cooperation with several companies, such as Roche, Novartis, NBE Therapeutics, UCB-Celltech and Specifica. These collaborations with the industry indicate the relevance of his work to biotechnological drug development. Moreover, he is also very active in the wider Swiss and international scientific environment, serving on various committees and leading the organisation of the first conference on “Systems Biology of Adaptive Immunity”, to be held this spring in Ascona. In view of this track record, he was able to attract substantial third-party funding amounting to over 5 Mio. CHF since 2012.
2016 has been a successful year for Professor Sai Reddy. In recognition of his ground-breaking research for the next generation of immunotherapy, Professor Reddy was awarded with two prizes: the ERC Starting Grant and shortly after the highly competitive Grand Challenges Explorations (GCE) fund by the Bill & Melinda Gates Foundation. The GCE grant funds individuals worldwide that can break the mold in how we solve persistent global health challenges. In his GCE-funded project, Say Reddy in collaboration with Professor Bruno Correia of EPFL (École Polytechnique Fédérale de Lausanne) will study, how low levels of the immune system-stimulating molecule C3d attached to a protein from a pathogen (antigen) can lead to the production of large numbers of pathogen-fighting antibodies and thereby boost the efficacy of vaccines. Professor Reddy emphasises: “Prof. Correia will work closely with my group to produce and engineer our molecular vaccine adjuvants so that they stimulate immune responses with greater efficiency.” Sai Reddy’s research is one among the 40 final projects awarded by the Gates Foundation (out of more than 1'400 applications).

KEY FIGURES
Prof. Reddy’s research group (totally 19 staff members)
- Postdocs 2
- Doctoral students 10
- Master students 5
- Administrative & technical staff 2

UPDATE RAPID REPROGRAMMING OF ANTIBODY SPECIFICITY COULD EVENTUALLY MITIGATE PANDEMS IN THE FUTURE
ETH-Professor Sai Reddy and his research team have engineered a new platform referred to as “plug-and-(dis)play hybridomas” for reprogramming the antibody specificity of immune cells. Hybridoma is a traditional technique for producing large numbers of identical antibodies (so-called hybridoma cells). However, previous methods were only able to alter the constant region of the immunoglobulin locus and it required 6 months to one year for producing such stable antibody cell lines. By applying the brand new genetic engineering method of CRISPR-Cas9 to the antibody producing hybridoma cells, Professor Reddy exchanged the variable regions of the immunoglobulin locus of the immune cells and thus was able to reprogram their specificity. The new method is inexpensive and takes solely 1-2 weeks. Reddy’s new method opens up a number of future opportunities. For example, during the 2014 Ebola virus outbreak, there was a severe shortage of a highly-promising experimental antibody drug, due to the long time frame of one year to generate stable cell lines. The plug-and-(dis)play hybridoma platform could be used to produce such antibody drugs in pandemic and emergency situations in much shorter time. Professor Reddy has filed a European patent application in April 2016, which has attracted the interest of several biotech companies.
UPDATE KICK-OFF FOR THE CONSTRUCTION OF THE BSSE-BUILDING IN BASEL

This year, the construction of the new ETH-building on the Schällemätteli campus in Basel will start. In 2021, the Department of Biosystems Science and Engineering (D-BSSE) will presumably move from its current temporary accommodation on Rosental campus into its new home. The BSSE building will be located in immediate vicinity of the University of Basel’s life science buildings, such as the new “Biozentrum” tower that will be officially opened in autumn 2018, and the city’s hospital. With the concentration of the 40 sites, currently scattered throughout the city, the Schällemätteli campus will become a hub for life science in Basel with international reputation. Their close proximity will allow the two universities to tap professional as well as infrastructural synergies, thus securing the long-term future of ETH Zurich on the site.

“The Basel site gives ETH Zurich access to one of Europe’s largest research environments in the life sciences - the interdisciplinary environment that is so essential for successful research in synthetic and systems biology, and personalised medicine.”

Professor Timm Schroeder
Chair Department of Biosystems Science and Engineering

View of the future BSSE-building at the Schällemätteli campus. With its six storeys, the building’s height is in line with the surroundings. (Visualisation courtesy: Public real Estate Management Division (PREM) of ETH Zurich / Nickl & Partner Architekten AG).

KEY FIGURES

D-BSSE in numbers

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professors</td>
<td>19</td>
</tr>
<tr>
<td>Postdocs and senior scientists</td>
<td>81</td>
</tr>
<tr>
<td>Doctoral students</td>
<td>146</td>
</tr>
<tr>
<td>Master students</td>
<td>108</td>
</tr>
<tr>
<td>Spin-offs</td>
<td>8</td>
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<tr>
<td>Grants</td>
<td>88</td>
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<td>thereof ERC grants</td>
<td>11</td>
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</table>

The Basel site gives ETH Zurich access to one of Europe’s largest research environments in the life sciences - the interdisciplinary environment that is so essential for successful research in synthetic and systems biology, and personalised medicine.

Professor Timm Schroeder (photo courtesy: D-BSSE / Pino Covino).
The generous donation of the Misrock Foundation has enabled me to build a research group at the interface of bioengineering and immunology. We have rapidly expanded our group and developed our goals towards applications in biotechnology, vaccines, and immunotherapy. This has led to a number of publications already accepted or currently in review.

Professor Sai Reddy,
Professor of Biomolecular Engineering

**RECENT KEY PUBLICATIONS**


**UPCOMING EVENTS**

- **D-BSSE celebrates its 10th anniversary**
  5th April 2017, 6 – 7:30 p.m. in Basel
  outlook on future research directions and anniversary reception
- **First conference on “Systems Biology of Adaptive Immunity”**
  14th - 17th May 2017 in Ascona, Switzerland
  (lead organizer: Prof. Dr. Sai Reddy)

**ACKNOWLEDGING OUR PARTNER**
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