Microbial (and cultural) mixed cultures

February 3, 2021
Lars Regestein

• Principle investigator and head of process development at Leibniz Institute for Natural Product Research and Infection Biology (German)
• Assistant Professor (Oberingenieur) at beginning of collaborative work (RWTH Aachen University)
• Research focus: microbial mixed culture, process intensification, scale-up and overall process development from μL to m³
Lars Rehmann

- Full Professor in Chemical and Biochemical Engineering at Western University (Canada)
- Assistant Professor at beginning of collaborative work
- Works on all sort of biochemical engineering

From Fuels to Pharmaceuticals: Biotransformation Process Development
Collaboration - What went in?

- Actively exchanged research personnel since 2014
- Wrote publications together
- Successfully applied for several grants together
2014

Canada

- Regestein (sabbatical)

2015

Germany

- Rehmann (sabbatical)
- Doer (8 moths, thesis chapter)
- Staaden (6 months thesis)

2016

Canada/Germany

- Golla and Mann (6 months each in London)
- Sarchami (1 month Aachen)

No specific funds

2017

Germany

- Rehmann (6 weeks)
- Munch (12 months, part of PhD thesis)

Feodor Lynen (Humboldt)

2018

Canada/Germany

- Rehmann (6 weeks in Aachen)
- Miebach (6 months in London)

2019

Germany

- Rehmann (6 weeks)

2020

Canada/Germany

- Deithers (6 months in London, mainly theoretical work)
- Jani, visitin Aachen canceled

No specific funds

2021

Canada/Germany

- Aiming to recruit post-doc from Aachen to London
- Maybe schedule Jani visit
- Potentially include Jena

Feodor Lynen (Humboldt)
Collaboration - What came out?

Easy to quantify

• International experience for 8 students
• Strong international network
• Exchanges each year since 2014
• Six joined publication

Hard to quantify

• Impact on ability to recruit HQP
• Impact on HQP career
• Impact on research grants (listing each us as ‘collaborators on multiple successful grant applications)
Practical aspects

• Students stayed enrolled at their home universities and paid through home universities
• Students were given ‘visiting’ status at host universities (avoids tuition fees, etc.)
• Cost of research was carried by host universities
• Cost to the PIs research accounts: Airline tickets and a small top-up to living costs
Challenges – Group Structure

**North America**

Large number of professors with relatively small groups

More flexible
Better ratio between students and professors

**Germany**

Only few professors with large groups

> 200 coworkers
Large resources
### Challenges – Group Structure

<table>
<thead>
<tr>
<th>Germany</th>
<th>Canada</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Annual budget:</strong> 3 million CAN $</td>
<td><strong>Annual budget:</strong> ~200,000 CAN $</td>
</tr>
<tr>
<td><strong>Approx. 80 coworkers</strong></td>
<td><strong>Approx. 12 coworkers</strong></td>
</tr>
<tr>
<td>– 11 non-scientific employees</td>
<td>– 1 Research Engineer</td>
</tr>
<tr>
<td>– 26 Post-docs and PhD “students”</td>
<td>– 12 Post-docs, PhD and MESc students</td>
</tr>
<tr>
<td>– 30 student assistants</td>
<td>– ??? undergraduate and graduate students</td>
</tr>
<tr>
<td><strong>PhD “students” in Germany (Eng):</strong></td>
<td><strong>PhD students in Canada (Eng):</strong></td>
</tr>
<tr>
<td>➔ PhD thesis after 4 - 6 years</td>
<td>➔ PhD thesis after 4 years</td>
</tr>
<tr>
<td>➔ Annual income 75,000 – 86,000 CAN $</td>
<td>➔ Annual income 14,000 CAN $</td>
</tr>
<tr>
<td>➔ Extra (industrial) projects</td>
<td>➔ Take courses</td>
</tr>
<tr>
<td>➔ IT, event management, public relations etc.</td>
<td>➔ Some minor teaching duties</td>
</tr>
<tr>
<td>➔ Give seminars, practical courses, support our lectures</td>
<td>➔ “Sometimes” experiments for their thesis</td>
</tr>
<tr>
<td>➔ “Sometimes” experiments for their thesis</td>
<td>➔ Supervise many students</td>
</tr>
</tbody>
</table>
What worked well?

- Connection between the right people
- Flexible small ‘program’
- Centered around people who were exchanged
- Not guided by external framework or milestones
- Visiting students were treated as locals and effectively supervised locally (willingness to give up control)
- Duration of visits 6 months or more
- Strong involvement of project leads
Questions?