

Digital Biology - Do it together

January 13 - 15, Berlin, Germany

CONFERENCE DAY 1 - WEDNESDAY 13 JAN

10:00 to 10:30	Seminary session 1 - Touch Ground* Introduction to the Digital Biology Seminary - Rüdiger Trojok		
10:30 to 10:40	Coffee break		
10:40 to 13:00	Show and tell: Technical introduction of participants' developments Demo: OpenDrop - Open Digital Microfluidic Platform, Version 2 - Urs Gaudenz (gaudilabs) Demo: Software platform for digital biology - Mirela Alistar & Frido Emans Demo: Bioprotocols and applications for digital biology - Rüdiger Trojok Lighting rounds (on the fly)		
13:00 to 15:00	Lunch break		
15:00 to 16:30	Seminary session 2* Discussion of agenda, crowdsourcing campaign and decentral development strategies		
16:30 to 17:00	Registration		
17:00 to 17:40	Talk: Digital Biology: vision, milestones and hurdles Rüdiger Trojok (ITAS, Synenergine)		
17:40 to 17:50	Coffee break		
17:50 to 18:10	Mini workshop: IP and its use - Urs Gaudenz (gaudilabs)		
18:10 to 18:55	Talk: Patents: Why Intellectual Property and Open Source are not necessarily mutually exclusive Tobias Kuban & Matthias Bock		
18:55 to 19:10	Coffee break		
19:10 to 21:30	Software for digital biology Mirela Alistar & Frido Emans	OpenDrop - Open Digital Microfluidic Platform, Version 2 Urs Gaudenz (gaudilabs)	Networking & refreshments

* If you are not directly involved in the development of digital biology, but you would still like to participate at the workshop, please apply through email (a motivation letter is required).

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CONFERENCE DAY 2 - THURSDAY 14 JAN

10:00 to 11:30	<p>Seminary session 3* - Open source publishing</p> <p>In the global, decentralized and open digital biology community, efficient sharing of data and results is crucial. Recently, many platforms and file formats offer you a better way to present, manage and store your data (groupwork and open discussion).</p>
11:30 to 11:45	Coffee break
11:45 to 13:00	<p>Seminary session 4* - Intellectual Property</p> <p>Intellectual Property is supported in theory by patents. In practice, patents hinder the free and open development and they have less and less a real chance to protect your own inventions. A collaborative and open approach to develop digital biology technology needs new legal instruments, such as open hardware, open software and open wetware licenses (groupwork and open discussion).</p>
13:00 to 15:00	Lunch break
15:00 to 16:30	<p>Conclusions of the Seminary</p> <p>Let's decide on a common toolset to publish and share to align our community projects to improve community work and compatibility, guarantee for fair use of contributions and to fend off hostile IP claims. Please prepare your favourite license types and webtools with pro and con arguments and send a link to the legal documentation to rt[at]openbioprojects.net</p>
16:30 to 17:15	<p>Talk:Open Standards and Modularity: strong projects need strong rules Federico Muffatto (digi.bio, NL)</p>
17:15 to 17:30	Coffee break
17:30 to 18:00	Project: OpenEvolution - Johann Bauerfeind
18:00 to 18:30	Project: The CellCraft Project: The Collaborative Cell - Celsa Diaz
18:30 to 18:45	Coffee break
18:45 to 19:30	<p>Talk: OpenDrop, a tale of tomorrow Eugenio Battaglia</p>
19:30 - 21:30	Networking & refreshments

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CONFERENCE DAY 3 - FRIDAY 15 JAN

10:00 to 12:00	<p>The first step of a long journey in Platform Design*: Eugenio Battaglia</p> <p>In any context where it has to do with a number of internal and external actors, it's crucial to understand the role their motivations play while they participate in <i>value co-creation</i>. The analysis of the value creation process is a critical step for understanding the platform: motivations are inextricably linked with that process and, therefore, are essential to understand as a first step.</p> <p>In digitally-mediated platforms we have two macro-group of entities:</p> <ul style="list-style-type: none">• Stakeholders are primarily those entities responsible for cooperatively grow, maintain and adapt the platform within time towards accomplishment of its mission milestones.• The Peer Segments are the different groups of users involved in the platform value co-creation but not directly involved in its governance. <p>In this very first session of a more comprehensive process that we hopefully continue in the near future, we will focus on understanding the intrinsic motivations of the foundational Stakeholders.</p>
12.00 to 12.15	Coffee break
12.15 to 13.00	<p>Conclusions and final decisions</p> <p>We will draw the final conclusions and decisions. Everything will be published in a document available to the public.</p>
13:00 to 15:00	Lunch break
<h1>Lab session</h1>	
21:00 to 23:00	Social event

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A special thank you
to the people that made
it happen:



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DAY 1 - KEYNOTE SPEAKERS

Digital Biology: vision, milestones and hurdles.



Rüdiger
Trojok

Digital Biology is the computer programming of bioassays using digital microfluidic biochips based on electrowetting on dielectric technology. Digital Biology allows for wide scale automation of procedures in synthetic biology by improving efficiency between 1000 to 100000 fold compared to manual laboratory work, for the first time enabling wide scale rapid prototyping for the iterative creation of biological systems. To successfully decentralize the Digital Biology technology, we want to develop Bioflux Technology—a platform that will automate the synthetic biology flow with great medical and commercial potential. Bioflux Technology will be a combination of a software suite for biologists to plan experiments, a microfluidic device, electronics hardware to run the experiments and the required wetware (biological reagents) to perform a wide range of standardized bioassays used in synthetic biology.

Patents: Why Intellectual Property and Open Source are not necessarily mutually exclusive



Tobias
Kuban,
Matthias
Bock

It is a common misbelief, that Open Source and Intellectual Property (IP) are opposites of each other. Inventors, who naturally have an interest in gaining profit from their inventions, often apply for patents to protect their IP, even if they believe in the benefits and philosophy of Open Source. But are these really contradictions? What specifically is a patent and what can it do for the inventor? More importantly, what are the economical reasons to grant patents? We would like to talk about the historical development of patents in Germany, especially software related patents and patents on life, by which we would like to explain why and how patents can co-exist with the concept of Open Source. Also we would like to provide practical key information and shed a light on potential problems, that especially community driven projects may face.

About Rüdiger:

He is a Diplom Biologist, that invented a novel contraceptive method based on genetically altered lactic acid bacteria. He worked as a freelance consultant for the office for Technology Assessment by the German Parliament on biohacking and synthetic biology. Since 2014 he works for the Institute for Technology Assessment and Systems Analysis at the Karlsruhe Institute for Technology on the EU program Synenergene. He is currently establishing a citizen science biolab in Berlin, and is supporting open-source biotechnology projects related to public life, politics and the arts.

About Tobias:

He is a lawyer and biohacker from Berlin and an active member of the Berlin-based biohacker association Biotinkering. In his free time he is working in his allotment garden, in particular towards breeding a kind of apple, which is resistant to the fire blight disease. For this purpose he has amongst other things has designed and built his own PCR machine.

About Matthias:

He is an engineer and biohacker from Berlin. He studied Biochemistry, Biophysics and Technical Informatics and is an active member of Biotinkering in the context of which he amongst other things has experimented with luminescent microorganisms and mushrooms, cellulose-producing microbial societies and flower dyes as pH indicators.

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DAY 1 - DEMO SPEAKERS



Urs Gaudenz

OpenDrop - Open Digital Microfluidic Platform, Version 2

A new version of the OpenDrop was conceived by members of the active digital biology community. In this talk Urs Gaudenz will present the current state of the development and give an outlook.

www.gaudi.ch

About Urs:

He is microengineer and founder of GaudiLabs. He is working as lecturer, consultant in innovation management and maker extraordinaire.

About Miri:

Since 2010, she has been working on developing Computer-Aided Design tools for digital microfluidic biochips. Her main research interests are in the area of system-level design of embedded systems, with a special focus on digital microfluidics. She is supporting open access research and she has organized citizen-science events, where she disseminates to the public with the aim of involving them into creating more knowledge.

About Frido:



Mirela Alistar

Compilation software with fault-tolerance

The droplet control algorithms are described with an emphasis on fault-tolerance.

www.bioflux.eu



Frido Emans

The backbone of the software platform

Frido Emans will present his design of a "universal" open source platform for DMF devices to control them (remotely) and aggregate data in a sensible, reusable way. The platform is able to service different breeds of DMF hardware, without having to change the code or the workflow. Also the platform has a level of separation between what you want to accomplish using the device, in terms of experiment or test, and how the software handles these demands.

www.digi.bio

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DAY 2 - KEYNOTE SPEAKERS



Federico
Muffatto

Open Standards and Modularity

Open standards and modularity have the power to improve our lives and future applications of every device. Digital microfluidics isn't different from any other discipline, it just benefits from a common environment where makers can develop and share new tools knowledge and users can seamlessly interchange parts and modules as they go.

OpenDrop, a tale of tomorrow

You might have heard of a new breed of organisational models, responding to the fast growing adaptability, engagement and collaboration needs within modern company structures. Or you might have simply experienced the sound problems of slowness, rigidity, bureaucracy, disengagement along with various kinds of waste and bottlenecks that "traditional" organisational models generate and suffer nowadays. What if OpenDrop is the first real experiment of a new way of doing research and business, together with a constantly growing, loosely coupled and horizontally managed team of value driven innovators? This is a tale from the future where in the development of OpenDrop (OD) we have deployed an innovative governance and operations management system which is meant to be adaptive, dynamic and anti-fragile. Where we have successfully laid the foundations for our governance in the principles of commons-based peer production and liquid management allowing anyone to contribute, and for this contribution to be accounted.

About Fede:

Federico Muffatto, synthetic biologist and genome editor in a synthetic biology spin-off in Amsterdam. When you don't find him designing DNA and trying to look busy filling pipette boxes you'll probably see him around the Waag Society Open WetLab or collaborating with designers and other people ordinary biologists never met in their lives, shocking them with the latest news from organisms design. He's collaborating to Digi.Bio project and Waag Society.

About Eugenio:

He studied molecular and system biotechnology with a specialization in integrative neuroscience. He experimented in the field of Life Sciences with emerging and low-cost technologies, solving global issues and exploring novel forms of ethical deliberation. He led the development and management of several projects acquiring the tools to deal with an increasingly complex and multidisciplinary environment. His mission is to build and nurture a collaborative society by connecting people, organisations and ideas around fairness, openness and trust. He supports meaningful projects in social innovation, enabling fruitful collaborations with public institutions and progressive companies that want to build a resilient society.



Eugenio
Battaglia

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DAY 2 - PROJECT SPEAKERS

OpenEvolution



Johann
Bauerfeind

Evolution is the basic premise which enables any creatures to adapt to threatening conditions. Adaptation ensures the survival of the species but also allows you to use it as a tool. In this project, automation is used to establish an automated selection device to drive the evolution of microorganisms. By building a parallel operating turbidostat system, we can pressure microorganisms to adapt and build new molecular machinery for survival. OpenEvolution aims to establish a remote controlled experimental system to culture and develop designer-organisms in an open setting.

About Johann

He is a Life Science Engineer, founder of the Berlin iGEM team, co-founder of the green biotech-startup Solaga as well as a big fan of open-innovation projects.

The CellCraft Project: The Collaborative Cell



Celsa Diaz

Nowadays, a huge amount of scientific data is created by new technologies. However, bioinformatics can not pay attention to the detail or be creative analyzing data as humans. Collaboration by citizens and scientists, on the other hand, seems to be the perfect complement to analyze and understand scientific data in a more creative and efficient way (i.e. Fold-it, Galaxy Zoo). Thus, citizens are introduced for the first time into research projects, publications and they can visualize and learn science from real data. The CellCraft Project would like to introduce molecular biology into this movement by developing a platform of interaction - Minecraft game - where citizens can create cellular scenarios by uploading real 3D biomolecules simulating molecular processes. Furthermore, citizens can collaborate in a community with scientists where decisions are democratically taken.

About Celsa:

She holds a Diploma in Biochemistry and a Master degree in Bioinformatics. She worked on biological databases development as well as on big scientific data analysis applying machine learning during her studies at the Pompeu Fabra University. Furthermore, she worked on phylogenetic analysis and self-organization processes at the Spanish National Cancer Research Centre (CNIO) and the University of Göttingen. Her main interest is to increase transparency and democracy in decision making and evaluation process of institutional science in order to involve citizenship.