

Deep Tech Exploration at the ZEISS Innovation Hub Dresden



Dr. Tilman von Strauwitz Innovation Scout@ZEISS

Agenda



Who is Tilman?

ZEISS

The ZEISS Innovation Hub in Dresden

Why do we do Deep Tech Exploration?

Deep Tech Exploration Method

Who is Tilman? A little bit about me





Studies of Materials Science 2009 - 2015



2016 - 2021PhD in Biomaterials Science (Bioprinting, Tissue Engineering)



Since 2022











Publishing name ORCID

Tilman Ahlfeld 0000-0002-6350-3399

34 peer reviewed publications, 2 book chapters +proceedings + manuscripts under review/in prep

Georg Helm Prize 2021 PhD Thesis Award of the German Society for Biomaterials





A small piece of Tilman's research in the field of nano science





Dr. Gianluca Cidonio

now Fondazione Istituto Italiano di Tecnologia, Rome, Italy



Prof. Richard Oreffo

University of Southampton, Southampton, UK









disc ~ 25 nm diameter by 0.92 nm thick

Cummins, J Non-Crystal Sol, 2007

A small piece of Tilman's research in the field of nano science





Microextrusion printing of Laponite, alginate and methylcellulose



Laponite facilitates sustained release of growth factors from 3D bioprinted constructs



Figure 8. Ratio of viable cells in relation to total cell count over 21 days, determined by cell number analysis in cLSM pictures. (a) 3-3-3 samples revealed a cell viability of 70%–75% for all time points. The 0-3-9 control showed a lower cell viability of 60%–65% at day 1 and 7 before a higher cell viability after 14 d and 21 d was observed. (b) Cell density obtained by the image stacks (day 1 was set as 100%). No significant change of the cell number and density was detected over a culture period of 21 days for 3-3-3 samples. The cell density of 0-3-9 decreased significantly over time (mean \pm SD, n = 15, ***p < 0.001).

Bioprinting of living mesenchymal stem cells is possible and better with Laponite



Ahlfeld & Cidonio et al., Biofabrication, 2017 Cidonio et al., Biofabrication, 2020



Seeing beyond





As the pioneer of science in optics, we continue to challenge the limits of our imagination.

With our passion for excellence, we create value for our customers and inspire the world in new ways.

ZEISS Microscopy Solutions Enabling Scientists

In 1857, Carl Zeiss developed his first microscope with an assembled optical system. In the following years, ZEISS Microscopy Solutions became increasingly powerful and enabled significant scientific progress.

Microscopy Solutions from ZEISS helped Robert Koch identify Tuberculosis bacteria. And this was a key to fighting it.







ZEISS Contributions as Enabling Partner

More than **30** Nobel laureates

used ZEISS systems to advance scientific progress

About **80%** of microchips worldwide

made on ASML lithography systems with ZEISS optics

More than **50** camera lenses were sent to space during the NASA space missions

3 technical Oscars

were conferred on ZEISS lenses and movies filmed using ZEISS lenses have received numerous Oscar-nominations

600,000 surgical procedures every year with the ZEISS KINEVO 900 FACTS

New patent applications

638

R&D investments in € million

Investments in Research & Development

Innovations shape the future: Research and development teams at ZEISS are working hard to constantly expand our role as technology leader and market shaper. ZEISS has been making sustainable investments in R&D in order to achieve this goal. 1,151

Investment by % of revenue



FACTS



ZEISS Worldwide

Employees



Locations worldwide (rounded)



Countries (rounded)

50

Headquarters: Oberkochen, Germany







Shaping the Future The ZEISS Segments

Semiconductor Manufacturing Technology Industrial Quality & Research Medical Technology

Consumer Markets









2.757 € billion in revenue

6,215 employees

2.066 € billion in revenue

7,534 employees

2.251 € billion in revenue

6,829 employees

1.569 € billion in revenue

13,008 employees



Shaping the Future The ZEISS Segments

Semiconductor Manufacturing Technology Industrial Quality & Research Medical Technology Consumer Markets









Strategic Business Units

Semiconductor Semiconductor Process Control Manufacturing Mask Solutions Solutions Optics Industrial Quality Solutions Research Microscopy Solutions Microsurgery Ophth

Ophthalmic Devices

Consumer Products

Vision Care

SCIENTISTS ARE THE BACKBONE OF ZEISS





Expert ladder facilitates visible research-driven career

optical devices mobile robotic industry systems embedded sensors assisted surgery machine visualization virtual learning tissue hmi Imaq Ind economy computational prototyping design engineering ✓ All (2764) Marketing & Communication (86) Administration & Services Planning & Strategy (103) 🔫 (97) Digital & IT (693) Product Management & Business Development (231) Engineering (249) Regulatory Affairs (32) Finance & Controlling (52) 🗌 Research & Development 🚽 Human Resources (101) (366) Law & Patents (14) Sales & Service (309) Manufacturing / Production Supply Chain & Quality (141) (290)

→ https://www.zeiss.com/corporate/int/careers.html

ZEISS Innovation Hub DD Embedding ZEISS in the Dresden innovation ecosystem



22.02.2021

STRATEGISCHE ZUSAMMENARBEIT: TU DRESDEN UND ZEISS BAUEN KOOPERATION AUS



Die Technische Universität Dresden und die Carl Zeiss AG planen den Aufbau einer langfristigen strategischen Partnerschaft. Prof. Ursula M. Staudinger, Rektorin der TU Dresden und Dr. Karl Lamprecht, Vorstandsvorsitzender der ZEISS Gruppe, haben am Mittwoch, den 17. Februar 2021, einen entsprechenden Kooperationsvertrag zwischen der TU Dresden und der ZEISS Gruppe unterschrieben. Die im Rahmen eines virtuellen Treffens erfolgte Unterzeichnung soll die Verbindung der beiden Institutionen in den Bereichen Forschung, Lehre und Innovation, Weiterbildung und Internationalisierung sowie Recruiting festigen.





22.02.2021

Strategische Zusammenarbeit: ZEISS und die TU Dresden kooperieren

ZEISS wird in den nächsten Jahren seine Präsenz in Dresden ausbauen, um von dem hervorragenden Forschungs- und Innovationsumfeld zu profitieren.

> Mehr über das Thema erfahren

09.06.2021

Startschuss für den ZEISS Innovation Hub Dresden

Team bezieht Räumlichkeiten im EKFZ auf dem Campus des Universitätsklinikums

Mit dem ZEISS Innovation Hub Dresden bauen ZEISS und die Technische Universität Dresden ihre strategische Zusammenarbeit, die ein wichtiger Baustein der globalen Innovationsstrategie von ZEISS ist, weiter aus.

> Mehr über das Thema erfahren

ZEIN



How to find disruptive market scenarios **Technology-driven innovation**





Working **together** with scientists **Laddering the translation bias**





Companies are really good in transforming ideas into business

Researchers are really good in transforming money into ideas

Technological breakthroughs and paradigm shifts are often **the source of great business opportunities**, sometimes even **enabling the disruption** of old, or the even **creation of new markets**.

Examples:

- X-ray
- robotics in manufacturing automation
- digital cameras

The **ZEISS Innovation Hubs**, embedded in leading research ecosystems, specifically aim to **turn today's research into tomorrow's applications**.





Top Features

1 / Deep techs can solve big and intractable problems the world cannot solve right now

- 2 / Deep techs operates at the convergence of technologies
- 3 / Deep techs require multiple scenarios, be they alternative or evolutionary
- 4 / Deep techs implementation is not a one-man show

Main Challenges

- 1 / Deep techs imply larger risks throughout the entire exploration process
- 2 / Deep techs exploration is capital intensive
- 3 / Deep techs can take a very long time before market adoption

4 / Deep techs require **strong efforts to find compelling value propositions** through a clear reimagination of value chains, business models, and ultimately a *new reality*



Our ambition

We explore markets

- first with "confidators", later with MVPs
- that proof technological feasibility
- that have received positive feedback on desirability from first users
- with a (in the long run) viable business model

We think long-term

- on innovations that have the potential to shape markets within the next 10-20 years
- we work hypothesis-driven
- future scenarios and roadmaps
- we **think big, but start small** with concrete projects

Turning today's research into tomorrow's applications – together.

We work on technology-inspired innovation that

- is based on technology with a **TRL of 2-6**
- poses a disruptive threat
- offers growth opportunities in H3 or beyond current strategic business unit roadmaps

We work with partners who

- have profound technological expertise
- have the ambition to turn technology into innovation
- value our knowledge in technology and ideas

MARK



Seeing beyond

Contact me in case you have questions about transitioning to industry or if you believe that ZEISS can help you translating your ideas!

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