



ANNUAL REPORT 2021

Faculty of Medicine Faculty of Science Faculty of Veterinary Medicine (Vetsuisse Faculty)



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GRADUATE SCHOOL FOR CELLULAR AND BIOMEDICAL SCIENCES (GCB)

LETTER FROM THE PRESIDENT

Prof. Dr. Rupert Bruckmaierr

Dear colleagues

The Graduate School for Cellular and Biomedical Sciences (GCB), administered by the three University of Bern faculties (Medicine, Science and Vetsuisse) directly through the leadership of the PhD Committee, was fortunate to experience yet another impressive year; this despite difficult pandemic times. Staff remained flexible and creative finding ways to cope with another pandemic year while still being responsive to students. Students demonstrated remarkable resilience and productivity. New applicants again outpaced graduations (127 applications, 117 graduations). The gender student ratio remains welldistributed. Research output in terms of peer reviewed publications (298) and posters or short oral communications at conferences (77) increased over the prior year. The 534 registered students in 2021, nearly 300 of whom participated in the annual GCB symposium, showcased a wide variety of fantastic research projects. These and other key metrics found in this report, indicate that our structured graduate school system is effective. However once sufficient, the administrative and other resources required to continue to offer such a top-notch, competitive graduate school program are clearly at their limit as student population grows while administrative resources remain unchanged. GCB leadership will continue to explore and address the partially severe limitations in this area in the coming year and beyond.

While we are proud of our successes and positive trends, the in-depth self-assessment conducted by the GCB in 2021, revealed areas where we could improve. We have, in keeping with our drive for continuous improvement, begun initiatives to address the key issues uncovered. We believe with these efforts, we will further strengthen our position not only as the largest graduate school in Switzerland but position ourselves to be one of the most if not the most competitive in our fields. Actively recruiting and attracting top PhD candidates will be facilitated by our energies in these areas.

We will expand efforts, through existing and new partnerships, to raise the graduate school's national and international visibility. This includes increasing offerings in cutting-edge technology training and in developing fields (e.g., translational techniques and research, computational analysis), as well as in transferrable skills. We are increasing efforts to explore additional funding sources to support these initiatives. Networking opportunities will be established in and across all three participating faculties, according to topics of interest to enhance scientific exchange between students and faculty. Introductory training will be provided for young, new group leaders. Further to that, we look to improve the balance of mentors-to-students ratio from the current disproportionate ratio to 1:5. Internal administrative processes to support all students, supervisors, co-advisors, mentors, and teaching staff will be optimized. An eLearning platform, designed to facilitate this process of communication and training will be developed, kicked off, and launched by year-end 2022.

I invite you to learn more about the GCB's 2021 activities and accomplishments by reading the report contained in the following pages. We are proud to have successfully navigated the challenges of 2021, but will not miss the endless Zoom sessions, virtual meetings, and the worst of the pandemic's effect on our health and well-being, nor its side effects. We are grateful to finally be together again in-person in the laboratories, classrooms, offices, and cafeterias where we are collaborating, discussing, and learning. Already in 2022, we are continuing the positive trends and working on our new initiatives to achieve our goals. We are optimistic about our future.

Prof. Dr. Rupert Bruckmaier President, GCB PhD Committee

GCB

TABLE OF CONTENTS	
INTRODUCTION	
Letter from the President	2
VISION & MISSION	
Vision & Mission GCB Offices	4
Mittlestrasse 43, 3012 Bern	5
ORGANIZATION	
Organization Chart	6
PhD & Expert Committee Organization	7
Mentor Guidelines	8
Mentor Prizes and Honors	9
PHD PROGRAM	
PhD Program Structure	10
PhD & DVM Curriculum	10
PhD Specializations	11
MD-PhD Program & Curriculum	12-13
MD-FID Fellowships	15
COURSES & SEMINARS	
Individual Study Program	14
Lectures, Tutorials, Book clubs	14
Transferable Skills Courses	15
GCB Seminars	15
GCB ACADEMIC EVENTS	
Symposium	16-19
Graduations	20-30
Awards & Recognitions	30-34

FACTS & FIGURES

2021	34-34
Nationalities	35
Five-Year (2017-2021)	37
GCB Self-Assessment (2017-2021)	38-39

ACKNOWLEDGMENTS

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Fotos of Mittlestrasse 43, GCB offices of the University of Bern: $\ensuremath{\mathbb{C}}$ Universität Bern











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ORGANIZATION

The Graduate School for Cellular and Biomedical Sciences (GCB) of the University of Bern, jointly administered by the Faculties of Medicine, Science and Vetsuisse, offers structured, experimental research training programs leading to the following degree titles:

- PhD in Cell Biology
- PhD in Biochemistry and Molecular Biology
- PhD in Biomedical Sciences
- PhD in Immunology
- PhD in Neuroscieces
- PhD in Biomedical Engineering
- PhD in Computational Biology
- MD,PhD (Doctor of Medicine and Philosophy)
- DVM,PhD (Doctor of Veterinary Medicine and Philosophy)
- DDS,PhD (Doctor of Dentistry and Philosophy)

The PhD program provides comprehensive, internationally competitive training in the theory and practice of experimental research as well as in-depth specialist knowledge of students' individually selected research areas. It directs students towards independent scientific work, enabling them to assume scientific responsibility.

Research training is available in the areas of biochemistry and molecular biology, biomedical engineering, biomedical sciences, cell biology, immunology, neuroscience, and epidemiology. GCB applicants possess a master's degree or equivalent in life sciences or related areas, biomedical engineering, medicine, dentistry, or veterinary medicine.

2021 Expert Committee Membership Changes

Biological Systems	Biomedical Engineering	Biomedical Sciences	Cell Biology	Molecular Biology & Biochemistry
		Welcomed*		
	Wilhelm Wimmer	Véronique Bernier Gosselin	Marco Alves	
	Francesco Clavica	Anja Kipar		
		Salome Dürr		

*Only new members added and no departures

The GCB is supervised by the PhD Committee (executive committee), comprised of members of the Faculty of Medicine, the Faculty of Science, and the Vetsuisse Faculty Bern, as well as the Program Coordinator. Each faculty member acts as President, alternating every two years.

GCB Expert Committees

Five expert committees with competencies in

- biological systems
- biomedical engineering
- biomedical sciences
- cell biology
- molecular biology and biochemistry

are responsible for the admittance, guidance, and evaluation of the PhD candidates. Each research project is assigned to one of the GCB Expert Committees, with one of its members acting as mentor to the PhD candidate. The supervisor, mentor and student plan the individual training program of the PhD candidate together.

The GCB organization chart showing the expert committee membership in 2021 is shown on the previous page.

General duties and responsibilities of the mentor

- The mentor is the link between the GCB and each student's thesis advisory committee and must therefore always be a member of one of the GCB Expert Committees. The mentor ensures that the GCB rules are observed. Thus, s/he must be acquainted with the most important rules of the GCB regulations, in particular the points which relate to course requirements (minimal ECTS) and examination regulations.
- Each Expert Committee member should be prepared to serve as mentor for several PhD students. •
- Interview meetings of the GCB Expert Committees are conducted three times a year to evaluate prospective PhD • candidates. The mentor attends the meetings whenever possible.
- A mentor is assigned to each PhD student immediately after the interview. •
- The mentor does not require specific expertise in the research project, but monitors the progress of the work in relation to the submitted research plan and intervenes if problems arise.
- The mentor is the primary contact for the PhD student and the supervisor if any conflicts arise between them. •
- Five main tasks are assigned to the mentor throughout a PhD project; i.e., •
 - 1. leads the mentor meeting
 - 2. evaluates the annual progress reports
 - 3. chairs the mid-term evaluation
 - chairs the thesis defense
 - 5. mediates if required in case of conflict



Expert Committee Members and Mentors Prizes and Honors*

The Dutch Research council has awarded Laura Marchal-Crespo a Vidi grant to develop "the worldwide first robotic system able to provide affordable hyper-realistic sensorimotor training that allows for a trustworthy user-friendly therapy personalization", according to the TU Delft. Laura Marchal-Crespo leads the Motor Learning and Neurorehabilitation lab at the ARTORG Center and is Associate Professor at the Delft University of Technology. Laura Marchal Crespo is member of the department of Cognitive Robotics at the Faculty of Mechanical, Maritime and Materials Engineering in Delft. She also heads the lab for Motor Learning and Rehabilitation at the ARTORG Center, a member of the GCB Biomedical Engineering Expert Committee.

Thomas Lutz, Professor at the Institute of Veterinary Physiology and Associate Dean Teaching, was selected by the jury for this year's Society for the Study of Ingestive Behavior (SSIB) Hoebel Prize for Creativity. The symposium, including the award ceremony and a lecture by Thomas Lutz, took place July 12-15, 2021.

Jessica Bastiaansen was Selected as Fellow of the Society for Cardiovascular Magnetic Resonance (SCMR), elected Chair of the Cardiovascular Imaging Study Group of the European Society for Molecular Imaging (ESMI) and started with her SNSF Eccellenza Professorial Fellowship in 2021. She is a new mentor since beginning 2022.

Walter Senn announced the joint research between himself and Mihai Petrovici, Senior Researcher, Group Leader in the Department of Physiology (currently in discussions to become a GCB mentor, himself) on implementing deep neural network with slow neurons (https://www.uniaktuell.unibe.ch/2021/neurons_have_the_ability_to_look_into_the_future/index_eng.html) was selected this year as a NeurIPS presentation. This is currently the largest Artificial Intelligence conference, making the honor all the more signifcant.

*Information received as of 03.05.2022

PHD PROGRAM

PHD

The GCB offers structured training in experimental research in the fields of biochemistry, cell and molecular biology, immunology, biomedical sciences, epidemiology, neuroscience, and biomedical engineering, leading to a PhD, MD,PhD, or DVM,PhD degree. The thesis projects are carried out at the laboratories of the three participating faculties (Faculty of Medicine, Faculty of Science, and Vetsuisse Faculties, Bern and Zurich) or at affiliated institutions. In 2021, these included:

CAScination AG, Bern

Empa (Swiss Federal Laboratories for Materials Science & Technology, CH

Laboratory for Biomedical Neurosciences (LBN), Torricella-Taverne

AO Research Institute, Davos

RMS Foundation. Bettlach

Swiss Institute of Equine Medicine, Bern

PROGRAM STRUCTURE

Each PhD candidate is supervised by a thesis committee consisting of the supervisor, a co-advisor, and mentor (a member of the appropriate GCB Expert Committee). The roles are specified as follows:

Supervisor hires the student and is responsible for the research project, adequate supervision, the laboratory infrastructure, and the salary of the candidate.

Co-advisor should not be affiliated with the same institute as the supervisor but should be an expert in the research area of the thesis project. S/he meets with the candidate at least twice a year to discuss and assess progress of the thesis work, as well as to advise and support him/her.

Mentor decides on the individual, tailor-made training program together with the candidate and the supervisor, considering the candidate's previous education and relevance to the planned research work.

External Co-referee - Toward the end of the PhD studies, an additional expert is added to the team, to promote independent evaluation of the thesis and oral defense.

PHD AND DVM CURRICULUM & PROGRAM REQUIREMENTS

a graded examination. Exams must be passed after a maximum of two attempts, as regulated by the Promotion Regulations, Art. 92 and Art.

Annual Progress Reports.

Pass a mid-term evaluation during the 2nd year – students present their work in a scientific seminar in the presence of their PhD thesis committee, to demonstrate in-depth knowledge of their research field.

Attend and participate in the annual GCB Symposium starting with the

SPECIALIZATIONS

Within the framework of the GCB PhD Program, four PhD Specialization Programs are currently offered. Participants must acquire



1. Cutting Edge Microscopy (CEM)



CellMigration

2. Stem Cells and Regenerative Medicine (SCRM)

The PhD Program Cell Migration started as an SNF-supported ProDoc program on October 1st, 2011 (https://cell-mig.ch). It has brought together a growing group of highly innovative principal investigators bring together complementary scientific expertise and methodological skillsets in the field of cell migration that permit for embedding a cutting-edge Swiss training program on Cell Migration for highly qualified and motivated PhD and MD-PhD students in the fields of biology, biochemistry, (molecular) human and veterinary medicine, immunology, pharmaceutical The current program can be found under the following link: <u>https://www.tki.unibe.ch/continuing</u>



4. Tumor Biology (New PhD specialization from June 2021) The Tumor Biology curriculum is embedded in the Graduate School for Cellular and Biomedical Sciences of the University of Bern (GCB) and will benefit from the existing Bern Cancer Research Cluster (BCRC) network. PhD students registered to the program will benefit from: Basic knowledge in molecular and cell biology, as well as advanced cancer research methods and concepts from the 20 cancer research cell biology, as well as advanced cancer research methods and concepts from the 20 cancer research groups currently participating in BCRC activities. These cancer research groups are part of 8 different Departments and Institutes at the University of Bern (DBMR, Institute of Pharmacology, Medical Oncology,

The PhD program Cutting Edge Microscopy received funding by swissuniversities and University of Bern during the period 2017 to 2021. An extension of the CEM PhD program was granted by the vice-rectorate Development of University of Bern for the two years period 2021 – 2022. The CEM program was launched in January 2017 and is jointly coordinated by the GCB and the Microscopy Imaging Center (MIC) of the University of Bern. The PhD candidates in this program focus on high-end

unravel the communication network of cells within the tissue and throughout the body during tissue

MD-PHD PROGRAM



MD-PHD CURRICULUM & PROGRAM REQUIREMENTS

I	Earn a minimum 25 ECTS, some of which may be obtained through previous laboratory work (MD thesis or other. Generally, the ECTS can be obtained by participating in approved, project-related, and interdisciplinary courses, workshops, seminars, and lectures. Course work for 6 ECTS (3 ECTS of which come from a course with a graded examination) tailored to the research project in addition to the basic 25 ECTs is mandatory (total 31 ECTS).
I	At least 3.0 ECTS must be earned from lecture courses or book clubs which include a graded examination. Exams must be passed after a maximum of two attempts, as regulated by the Promotion regulations, Art. 92 and Art. 191).
II	Participate in the course Scientific Integrity course. Annual Progress Reports.
IV	Pass a mid-term evaluation during the 2nd year – students present their work in a scientific seminar in the presence of their PhD thesis committee, to demonstrate in-depth knowledge of their research field.
v	Attend and participate in the annual GCB Symposium beginning with the 2nd year of PhD studies.

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Graduate School for Cellular and Biomedical Sciences (GCB)

Programm MD-PhD





A fundamental requirement includes in-depth education in natural science subjects. This basic training consisting of course work of 25 ECTS may be carried out either in parallel to the medical studies during the third to sixth year (Track I), or during the research work for the PhD thesis (Track II). Track I students receive personal mentoring by experienced researchers.

The MD-PhD Program thus consists of basic training (comprising 25 ECTS) and the additional mandatory course work (6 ECTS) in subjects which are suitable for preparing them for their particular research project (cell biology / biochemistry, molecular biology, immunology, neurobiology, tumor biology, etc.), and of the PhD thesis. Comprehensive <u>guidelines</u> are available on the GCB Website.

MD-PHD FELLOWSHIPS

A limited number of fellowships are available for PhD work, which are awarded by the Swiss Academy of Medical Sciences (SAMS) and the Swiss National Science Foundation (SNSF) with the assistance of private foundations within the framework of the national MD-PhD program <u>www.samw.ch/en/Funding/MD-PhD-Program</u>.







13

COURSES & SEMINARS

Seminars and courses are individually selected for each candidate from courses organized and supported by the GCB and from the teaching units of the faculties, as well as from courses offered by other Swiss universities. Doctoral students also participate in EU framework programs or in internationally organized summer schools, which provide high quality training in specific fields. These include, in particular:

- EPFL, Lausanne

- Doctoral Programs in Microbial Sciences and «StarOmics» (both CUSO)
- BENEFRI Neuroscience, Program (Universities of Bern and Fribourg)
- Cell Migration program in Immunosurveillance, Inflammation, Tumorigenesis and Metastasis (Universities of Bern, Fribourg, Geneva, and associated institutes)
- SSPH+ PhD Program in Public Health (Swiss School of Public Health)
- SLKMB Courses & Meetings LS2
- Science IT Support

INDIVIDUAL STUDY PROGRAMS

The individual training program assigned to each PhD candidate considers the student's previous training and relevance to the research work. PhD candidates may attend courses at the University of Bern or external courses and summer schools offered by other recognized institutions. Acknowledgement of external courses for the PhD are subject to the agreement of the mentor.

The list of approved courses listed on Doctoral Agreements increased to 532 Lectures, Tutorials, and Book Clubs (from 497 in 2020) approved for GCB PhD candidates. Of those, 322 (61%) were offered by the University of Bern institutes, 40 (8%) took place at ETH Zürich (Eidgenössische Technische Hochschule Zürich), 14 (3%) at EPFL, 10 (2%) University of Zurich and 146 (27%) were fewer than 3 instances from other institutions

GCB COURSES BY INSTITUTION



LECTURES, TUTORIALS, AND BOOK CLUBS

Special Courses Organized for GCB Students

Despite the disruption caused by the pandemic, new courses were added and held in 2021 and popular courses were offered twice to accommodate higher registrations than usual. Between mid-March and September and again from October through December, courses were moved from presence to online. Although some practical courses were not able to take place, most of the GCB courses and tutorials continued to the credit of dedicated and innovative faculty and students.

Popular Lectures, Tutorials, and Book Clubs

- Immunology Tutorial (9-10 senior scientists)
- Cell Biology («Happy Cell») Tutorial, (9-10 senior scientists)
- Principles in Transgenic Mouse Technology (C. Benarafa, U. Deutsch, & P. Krebs)
- Stem Cells & Regenerative Medicine (V. Enzmann and others)
- Antibiotic-Resistant Bacteria and One Health: From the Plate to the Bedside (A. Endimiani and others)
- Translational Cancer Research: Crosstalk in Academic, Clinical and Pharmaceutical Cancer Research: Willing to improve? ... (M. P. Tschan & N. Leupin)
- Topics in Tumor Biology (D. Stroka, M. P. Tschan, & Y. Zimmer)
- Lecture Course: International PhD Program in Immunology, Cell Biology and Biochemistry (S. Monticelli, IRB Bellinzona)
- Intro. to Epidemiology & Biostatistics (G. Schüpbach & J. Berezowski)
- Book Clubs, Journal Clubs and Seminars (Institute of Social and • Preventive Medicine ISPM)
- Statistical Data Analysis 1 and 2 (S. Haug)
- R Bootcamp (S. Haug)
- Introduction to R (D. Stroka, D. Sanchez-Taltavull)

Transferrable Skills Courses

•

- Scientific Communications for PhD Students
 - Presenting with Confidence
- Basics of Ethics in Health Sciences Research
- Effective Grant-Writing for Young Scientists
- Scientific Writing Course

GCB SEMINARS, RETREATS, ETC.

In 2021, as in past years, the «SCRM PhD Student Retreat» received financial funding from the GCB, as well as from the program for Stem Cell Research in Regenerative Medicine (SCRM), and other institutions.



Photo

8th SCRM PhD Students Retreat

As per tradition, the beautiful location of Gurten Park in Bern hosted our annual PhD students retreat on the 3rd of September 2021. We were very happy to have Prof. Michal Schwartz, Professor of Neuroimmunology at the Weizmann Institute of Science, Israel, as our academic mentor, and Dr. Jurgen Bürger, Professor for Translational Medicine and Entrepreneurship and Director of the sitem Center of Bern, as our industry mentor.

Favorable epidemiological conditions of late summer and protection measures always in place allowed us to hold the retreat despite the pandemic. The possibility of meeting other students and spending the day together was very exciting. Many students told us they have been looking forward to one of the very few current occasions for presenting their research and interacting with peers.

This year's retreat had a very high attendance, with 22 participants, including 13 who presented their work in a talk. Each talk was followed by an interesting scientific discussion, in which everybody got involved, leading to a fruitful exchange of ideas. In addition, coffee breaks, lunch and the closing Apéro were also nice opportunities to get to know each other and network in a relaxed environment. We are thrilled about the success of the event and hope students will continue to enthusiastically participate in the future.

Importantly, we would like to thank both our mentors for valuable support during the retreat. We really enjoyed the keynote lecture of our industry mentor Dr. Burger, especially for learning more about potential translation of our research into practical applications. We really appreciated his commitment in discussing with young researchers and his enthusiasm in illustrating to us future opportunities. Our academic mentor Prof. Schwartz gave her keynote lecture via Zoom. The work she has been doing in the interesting field of neuroimmunology and the achievements she has reached with her research have been impressive and very inspiring for us. A special thanks goes to Prof. Eliane Müller and to Prof. Marianna Kruithof-De Julio, who joined us for the retreat, contributed to a stimulating discussion and gave us precious guidance. We are deeply grateful to the Stem Cell Research and Regenerative Medicine Platform and to the GCB for financially supporting us to organize our retreat. We are grateful and happy to also have received additional funds from several companies that agreed to sponsor us. Special thanks also to the SCRM Office (Rene Aeberhard) for organizational support and to all the students who have enthusiastically participated. We are looking forward to welcoming interested students to our retreat which will take place on September 2, 2022.

On behalf of the Organizing Committee 2021

Viviana Rubino. Chantal Bachmann. Cristina Kalbermatter, Sandro Christensen

New Courses in 2021 Introduction to Radiopharmacology (E. Gourni)



SCRM 2021 Retreat, Sept. 3, 2021

GCB SYMPOSIUM

GCB SYMPOSIUM

Photo top left

Zoom Talk Session

Photos top right

Zoom Talk Session

Photo bottom

Talk Session

Zoom







GCB SYMPOSIUM

As part of the doctoral training, the GCB organizes an annual academic research symposium for its PhD candidates and their thesis committees. From the second year of study onwards, doctoral candidates are offered the opportunity to present their research projects in the form of brief lectures (posters - many of them combined with an additional Poster Flash presentation). The presentations are intended to illustrate the wide range of research projects, as well as to demonstrate the candidates' high level of competence and in-depth knowledge in the fields of cellular and biomedical sciences, and biomedical engineering. The presentations are thematically grouped according to the five competency areas («GCB Expert Committees») to which the research projects belong. The symposium also offers opportunities for GCB candidates, as well as for their supervisors and mentors to engage in mutually rewarding and highly stimulating discussions. Additionally, the symposium facilitates opportunities for active networking among peers and senior researchers.

Photo top GatherTown Poster Session



Photo bottom left GatherTown Main Hall

Photos bottom right

Welcome new PhD Committee Chair Prof. Dr. Rupert Bruckmaier



The PhD Committee decided to move the symposium to a virtual platform in considering the Covid-19 pandemic situation to protect participants while preserving the perennial event. On January 28, 2021, the GCB successfully held its first ever fully virtual GCB Symposium 2021 supported by ATORG's Prof. Dr. Tobias Nef and Dr. Stephen Gerber. Using the platforms Zoom and Gathertown, students presented 40 Talks, 100 Poster Flashes and 239 Posters. The feedback was overwhelmingly positive. Nearly 400 participants attended the Keynote Lectures, during which the GCB Coordinator curated questions from the audience and facilitated the discussions with the three keynote speakers.

The keynote addresses were given by three of Switzerland's own, two academic researchers from the University of Bern and an expert from Interregionale Blutspende SRK AG. Early in the symposium 2021 planning stages at the start of the corona virus pandemic in Spring 2020, the organizers were optimistic that we, as academic scientific researchers would be "looking back" at the pandemic and discussing the developments between then and now - infection rates, spread and virus mutations, vaccine development and rollouts, etc. The keynote speakers were invited with this in mind. Who could predict what would come in the ensuing months and where we would be on the day of the symposium? Given that we were still in the grips of the pandemic, and that our speakers were very much still in the fight, it was our great honor to have the continued commitment of several of the University of Bern's own frontline researchers for keynote speakers. Their individual and collective sustained dedication and perseverance deserves all our heartfelt, sincere thanks and recognition. This panel was a highlight to the 2021 symposium.

Following the keynote address, outgoing GCB President, Frank Stüber introduced his successor, Rupert Bruckmaier, who accepted the responsibility and assured the participants he would continue the work of his predecessor and did not anticipate any major changes during his tenure.



Photo Prof. Dr. Volker Thiel

Photo

Dr. phil. nat. Caroline Tingueley



From Genome to Function -Phenotypic Characterisation of Pandemic SARS-CoV-2 Variants

Prof. Volker Thiel studied Biology at the University of Würzburg, Germany and Corona has marked his academic life, as research only, since he did already his master's on SARS-CoV-1 and completed his PhD in that field in 1998. He habilitated in Virology at the Vetsuisse Faculty in Zürich and moved 2014 to the University of Bern where he is Professor and chair in Virology at the Vetsuisse Faculty Bern and head of the division Virology at the Institute of Virology and Immunology (IVI). Furthermore, he recently was nominated as the director of the Multidisciplinary Center for Infectious Diseases and Immunity (MCID) from the University of Bern. The Center has just been founded to address pandemic situations using an interdisciplinary approach. One of his many major achievements is the establishment of reverse genetics system for various coronaviruses, including Human Coronavirus 229E, SARS-CoV and SARS-CoV-2. He was the first to report a molecular clone for a human coronavirus in the beginning of 2020.



Dr. phil. nat. Caroline Tingueley Interregional Blood Transfusion SRC Ltd (Bern)

A Blood Transfusion Service in the time of Covid-19

Dr. Caroline Tinguely is Head of the Laboratory of Infectious Markers (donor screening for infectious markers and blood groups) at the Interregional Blood Transfusion SRC Ltd (Bern) and Head of the National Reference Laboratory (Infectious Marker) of the Blood Transfusion Service Swiss Red Cross (BTS SRC) Switzerland. She got her PhD in 2000 in Immunohematology from the University of Berne. In 2001 she started as scientific co-worker in Quality Management at the Blood Transfusion Service, SRC, Berne and is since 2011 in her current position. She was and still is in charge of determining the best reliable test to detect SARS-Cov-2 (antigen) as well as antibodies against the virus.



Photo Pixabay Geralt 22459



Prof. Dr. Martin Bachmann Department of Immunology University of Bern

Development of a vaccine against COVID-19: ups and downs

Prof. Martin Bachmann is internationally known for his research evolving around therapeutic vaccines using virus particles. He is a Professor in Immunology at the University of Bern, the University Oxford, and since 2017 a visiting Professor in Anhui Agricultural University, China. He started his PhD in the field of antiviral immune responses in the laboratory of Nobel Laureate Rolf Zinkernagel (1991-1995), before joining Pam Ohashi in Toronto (1995-1997) and working as a Principle Investigator at the Basel Institute for Immunology (1997-2000). In a next step, Bachmann focused his research on vaccine development and led research at Cytos Biotechnology AG in Schlieren, Canton Zurich, for more than 10 years (2000-2012). During this time, clinical proof-of-concept was achieved in humans in several indications, including a vaccine against hypertension [1], smoking [2], allergy [3] and asthma [4]. A vaccine he developed against Alzheimer's disease is in a registration trial at Novartis. In 2012, Bachmann turned his attention back to academia and continued to focus on therapeutic vaccines based on virus-like particles. In collaboration with Evax AG and Hypopet AG, a successful proof-of-concept was obtained for therapeutic vaccines against insect sting allergy in horses [5] and atopic dermatitis in dogs [6]. Further, it was possible to make cats hypoallergenic by means of vaccination to facilitate cohabitation with allergic owners [7]. Since the beginning of the COVID-19 pandemic in 2020 around the novel coronavirus SARS-CoV-2, Bachmann has also been researching a vaccine with the biotech company he founded, Saiba [8].

Photo

Prof. Dr. Martin Bachmann



2021

117 NEW GRADUATES CONGRATULATIONS!

Nicoleta Anghel, PhD in Cell Biology (September 15) Institute of Parasitology, Vetsuisse Bern (Prof. Andrew Hemphill) «Advances, efficacy, and safety of compounds for the treatment against the protozoan parasites Toxoplasma, Neospora and Trypanosoma»

Paola Antonello, PhD in Immunology (November 24) Institute for Research in Biomedicine IRB, Medical Faculty (Prof. Marcus Thelen) «New insights in ACKR3 biology: Regulation of CXCR4/CXCL12 mediated chemotaxis of B cell lymphoma through LTB4 secretion»

Prakash Arullampalam, MD PhD (Doctor of Medicine and Philosophy) (November 8) Biochemistry and Molecular Medicine, Medical Faculty (Prof. Hugues Abriel) «Physiology, Pathology and Pharmacology of TRPM4 in the heart»

Aydin Sidar, PhD in Immunology (February 5) Theodor Kocher Institute, Medical Faculty (Prof. Britta Engelhardt) «Cellular and molecular mechanisms involved in CD8+ T-cell migration across the blood-brain barrier during immunosurveillance and neuroinflammation»

B

Maud Bagnoud, PhD in Biomedical Sciences (March 26) University Hospital, Medical Faculty (Prof. Andrew Hao-Kuang Chan) «Mechanisms to Improve Glucocorticosteroid Efficacy in Multiple Sclerosis»

Johanna Magdalena Baumgartner, PhD in Immunology (September 6) Institute of Pathology, Medical Faculty (PD Dr. Stefan Freigang) «Impact of Oxidized Phospholipid/Nrf2 Signaling on Macrophage Differentiation and Function in Health and Disease»

Sebastian Toni Bechara, PhD in Biochemistry and Molecular Biology (September 28) Institute of Cell Biology, Faculty of Science (Prof. Dr. Mariusz Nowacki) «... Of long non-coding RNAs, genomes and their rearrangements»

Hervé Besançon, PhD in Cell Biology (September 24) Institute of Anatomy, Medical Faculty (PD Dr. Eduard Babiichuk) «Tailored Liposomal Nanotraps for the Treatment of Streptococcal Infections»

Niccolò Bianchi, PhD in Immunology (December 16) Institute for Research in Biomedicine IRB, Medical Faculty (Dr. Silvia Monticelli) «Regulation of inflammatory phenotypes in human T helper lymphocytes»

Marius Reto Bigler, Doctor of Medicine and Philospohy (MD,PhD) (June 9) Department of Cardiology, Bern University Hospital, Medical Faculty (Prof. Christian Seiler) «Intracoronary electrocardiogram as a direct measure of myocardial ischernia»

Sara Bonetti, PhD in Biochemistry and Molecular Biology (July 2) Institute of Biochemistry and Molecular Biology, Medical Faculty Bern (Prof. Dimitrios Fotiadis) «Functional, biochemical, and structural characterisation of an L-lactate transporting SLC16 homologue»

Loïc Borcard, PhD in Biomedical Sciences (June 28) Institute of Virology and Immunology, Vetsuisse Faculty (PD Dr. Gert Zimmer) «Functional Analysis of the Role of the Stalk Region of Neuraminidase in the Balance between Influenza A Virus Hemagglutinin and Neuraminidase»

Annika Bremhorst, PhD in Biomedical Sciences (June 16) VPHI, Vetsuisse Faculty Bern and University of Lincoln, UK (Prof. Hanno Würbel) «The Identification of Facial Expressions of Emotions in Dogs (Canis familiaris) using a Facial Action Coding System»

Michael Brilhante Quinta, PhD in Biochemistry and Molecular Biology (January 27) Institute for Veterinärbakteriologie, Vetsuisse Faculty (Prof. Vincent Perreten, Prof Andrea Endimiani) «Unveiling the nature of antibiotic resistance using next-generation sequencing»

Melanie Brügger, PhD in Cell Biology (May 20) Institute of Virology and Immunology, Vetsuisse Faculty Bern (PD Dr. Marco Alves) «The role of the pulmonary mesenchymal compartment during respiratory syncytial virus disease»

Julia Bruggisser, PhD in Biochemistry and Molecular Biology (March 25) Institute of animal pathology, Vetsuisse Faculty Bern (Prof. Horst Posthaus) «Clostridium Perfringens β-Toxin Receptor Identification and Oligomer Structure»

Hang Thi Thuy Bui, PhD in Immunology (June 21) Institute of Pathology, Medical Faculty (PD Dr. Stephan Bernd Freigang) «Cell Type-specific Regulation of Interleukin-1-driven Inflammation»

Emmanuele Giuseppe Bulla, PhD in Neuroscience (November 11) Department for BioMedical Research (DBMR), Medical Faculty (Prof. Pascal Escher) «Molecular mechanisms of photoreceptor differentiation»

Martina Caliò, PhD in Biomedical Sciences (April 12) Institute of Surgical Technology and Biomechanics (ISTB), Medical Faculty (Prof. Benjamin Gantenbein) «Intervertebral disc disease and osteorarthritis: Approchaing the research needs using RNA sequencing and mechanical unloading»

Xinyue Chang, PhD in Immunology (September 15) Department of Rheumatology, Immunology and Allergology (RIA), Medical Faculty (Prof. Martin Bachmann) «On the role of antibody affinity in allergic responses»

Gabriele Chiffi, PhD in Immunology (December 16) Institute for Infectious Diseases, Medical faculty (Prof. Stephan Leib) «Sleep-wake disorders after tick-borne encephalitis»

Daniela Condeescu-Ivan, PhD in Neuroscience (August 4) Theodor Kocher Institute, Faculty of Medicine (Dr. Giuseppe Locatelli) «Myeloid cell recruitment to the central nervous system during neuroinflammation - migration pathways and functional polarizations»

Lara Contu, PhD in Biochemistry and Molecular Biology (April 6) Department of Chemistry and Biochemistry, University of Bern, Faculty of Science (Prof. Oliver Mühlemann) «Novel interplays between Semliki Forest virus and the host cell»



Michel Fasnacht, PhD in Biochemistry (September 28) Department of Chemistry and Biochemistry, Faculty of Science (Norbert Polacek) «Functional Characterization of the Dynamic Post-Transcriptional 23S rRNA Modification ho5 C2501 in Escherichia coli»

David Miguel Ferreira Franciso, PhD in Computational Biology (September 7) Interfaculty Bioinformatics Unit, Faculty of Science (Dr. Rémy Bruggmann) «Next Generation Transcriptomics of the Brain Barriers: Generating novel experiments, establishing guidelines, and creating the BBBHub»

Tim Alois Fischer, PhD in Biomedical Engineering (May 6) ARTORG Center for Biomedical Engineering Research, Medical Faculty (Prof. Marco Caversaccio, PD Dr. Wilhelm Wimmer) «Spatial Hearing with Cochlear Implants: Development and Evaluation of Signal Processing Strategies»

Tatiana Fountoukidou, PhD in Biomedical Engineering (May 4) ARTORG Center for Biomedical Engineering Research, Medical Faculty (Prof. Raphael Sznitman) «Towards safer machine learning for ophthalmology applications»

Bettina Sarah Frauchiger, Doctor of Medicine and Philoposhy (MD, PhD) (June 2) Division of Respiratory Medicine, Department of Paediatrics, University Children's Hospital of Bern, Medical Faculty (Prof. Philipp Latzin)

«Multiple-Breath-Washout in Pediatric Lung Diseases: Transition from a specialized tool to widespread clinical application»

G

Matthieu Marc Alexandre Gast, PhD in Biochemistry and Molecular Biology (March 1, 2021) Department of Experimental Clinical Research and Veterinary Public Health, Vetsuisse Faculty (PD Dr. Philippe Plattet) «Paramyxovirus cell-exit: basic research and antivirals development»

Nina Gillis-Germitsch, DVM PhD (Doctor of Veterinary Medicine and Philosophy) (December 16) Institute of Parasitology, Vetsuisse Faculty Zurich (PD Dr. Manuela Schnyder, Dr. Lucienne Tritten) «Angiostrongylus vasorum: an emerging canid parasite affecting host coagulation»

Eleftheria Girousi, PhD in Cell Biology (September 1) Orthodontics and Dentofacial Orthopedics, Faculty of Medicine (Prof. Christos Katsaros, Dr. Martin Degen) «The role of IRF6 in cleft lip/palate and wound healing»

Sandra Glasmacher, PhD in Biochemistry and Molecular Biology (February 19) Institute of Biochemistry and Molecular Medicine (IBMM), Medical Faculty (Prof. Jürg Gertsch) «Analytical insights into the endocannabinoid system: from lipids to peptides»

Bulent Gözel, PhD in Biochemistry and Molecular Biology (April 29) Department of Neurological Sciences, Vetsuisse Faculty Bern (Prof. Anna Oevermann) «Impact of lineage I and rhombencephalitis-associated genes on infection cycle of Listeria monocytogenes in neural and nonneural cells»

Matthieu Guichard, PhD in Biochemistry and Molecular Biology (January 20) Agroscope, Swiss Bee Research Centre, Vetsuisse Faculty (Dr. Benjamin Dainat, Prof. Tosso Leeb) «Evaluating the potential for selecting resistance traits against Varroa destructor in honey bees»

Mitra Lovelin Gultom, PhD in Biochemistry and Molecular Biology (December 21) Institute of Virology and Immunology, Medical Faculty (PD Dr. Ronald Dijkman) «Development of airway epithelial culture models for the characterization of emerging respiratory viruses in human and animal reservoirs»

Η

Anthony Willy Hauser, PhD in Biomedical Sciences (February 5) Institute of Social and Preventive Medicine (ISPM), Medical Faculty (Prof. Matthias Egger) «Modelling HIV Drug Resistance in Southern Africa»

Silvan Rolf Heeb, PhD in Immunology (October 5) Department for BioMedical Research (DBMR), Medical Faculty (Prof. Dr. Johanna Anna Kremer Hovinga) «Novel insights into the immune response in immune-mediated and hereditary Thrombotic Thrombocytopenic Purpura»

Jan Wolfgang Henkel, PhD in Computational Biology (May 6) Institute of Genetics, Vetsuisse Faculty Bern (Prof. Tosso Leeb) «Genetic analysis of coat color phenotypes in domestic animals»

GRADUATIONS

Jan Hermann, PhD in Biomedical Engineering (December 1) ARTORG Center for Biomedical Engineering Research, Medical Faculty (Prof. Stefan Weber) «Towards robotic micro-milling for lateral skull base surgery»

Damian Hertig, PhD in Biomedical Sciences (October 20) University Institute of Clinical Chemistry, Medical Faculty (Prof. Jean-Marc Nuoffer) «Metabolic investigations of mitochondrial disorders in cell cultures by fluoro-oximetric and NMR methods»

Melle Holwerda, PhD in Biochemistry and Molecular Biology (March 11, 2021) Institute of Virology, Vetsuisse Faculty (Prof. Ronald Dijkman) «Establishment of tools to investigate the zoonotic potential of Influenza D virus.»

Suyi Hu, PhD in Biomedical Engineering (May 18) ARTORG Center for Biomedical Engineering Research, Medical Faculty (Prof. Marco Caversaccio, PD Dr. Wilhelm Wimmer, Prof. Raphael Sznitman) «Bayesian Brain-Inspired Computational Modeling of Tinnitus and Residual Inhibition»

Iris Sandra Hug, PhD in Biochemistry and Molecular Biology (June 15) Institute of Cell Biology, Faculty of Science (Prof. Mariusz Nowacki) «Investigating of IES concatemers in Paramecium tetraurelia»

Matthias Hulliger, PhD in Computational Biology (September 9) Swiss Institute of equine medicine & Institute of Genetics, Vetsuisse Faculty Bern (Dr. Vidhya Jagannathan) «An Integrative Analysis of microRNA and mRNA Expression in Horses Affected by Severe Equine Asthma»

Advaitha Subramanyam lyer, PhD in Biochemistry and Molecular Biology (August 18) Institute of Biochemistry and Molecular Medicine, Faculty of Science (Prof. Peter Bütikofer) «Phospholipid biosynthesis in Trypanosoma brucei: Role of the endoplasmic reticulum membrane protein complex (EMC)»

Aurelio Jenni, PhD in Biochemistry and Molecular Biology (June 9) Institute of Biochemistry and Molecular Medicine, Medical Faculty (Prof. Peter Bütikofer) «The Role of TbGPI2 in GPI and N-Glycan Biosynthesis»

Sarah Kaiser-Thom, Doctor of Veterinary Medicine and Philosophy (DVM, PhD) (February 21) Swiss Institute of Equine Medicine (ISME), Vetsuisse Faculty (Prof. Vinzenz Gerber) «Investigation of the microbiota in equine pastern dermatitis - bacterial community structure, isolates and resistance profiles»

Satish Kantipudi, PhD in Biochemistry and Molecular Biology (April 28) ATORG Center / AIMI, Medical Faculty (Prof. Dimitrios Fotiadis) «Heterologous overexpression of human membrane proteins in yeast for functional studies» Larissa Kernen, PhD in Biomedical Sciences (January 13) Centre for Fish and Wildlife Health, Vetsuisse Faculty (Prof. Helmut Segner) «Impact of environmental estrogens on the thymus of zebrafish»

Kim Klapan, Doctor of Medicine and Philosophy (MD, PhD) (June 17) Institute of Pharmacology, Medical Faculty (Prof. Hans-Uwe Simon, Prof. Dagmar Simon) «Evidence for lysosomal dysfunction within the epidermis in psoriasis and atopic dermatitis»

Sebastian Christoph Knell, DVM PhD (Doctor of Veterinary Medicine and Philosophy) (September 14) Clinic for Small Animal Surgery, Vetsuisse Zurich (Prof. Antonio Pozzi) «Pathogenesis and Treatment Strategies of Caudal Cervical Spondylomyelopathy in Dogs.»

Christa König, MD PhD (Doctor of Medicine and Philosophy) (September 23) Department of Paediatrics, Medical Faculty (Prof. Roland Ammann) «Fever in neutropenia in children undergoing chemotherapy for cancer»

Elena Kreutzer, PhD in Neurosciences (April 15) Department of Physiology, Medical Faculty (Prof. Walter Senn) «Natural-gradient learning for spiking neurons»

Thomas Kevin Kurmann, PhD in Biomedical Engineering (May 20) ARTORG, Medical Faculty (Prof. Raphael Sznitman) «From Diagnosis to Surgery: Towards Artificial Intelligence based Medical Assistants»

Yu-Noël Larpin, PhD in Cell Biology (December 6) Institute of Anatomy, Medical Faculty (PD Dr René Köffel) «Plasma membrane repair and cellular survival of immune cells in response to pore-forming toxins»

Nathan Georges François Leborgne, PhD in Immunology (August 11) Department of Infectious Diseases and Pathobiology, Vetsuisse Faculty Bern (Prof. Charaf Benarafa) «Role of serpins in the biology of invariant natural killer T cells and cathepsin G-mediated neutrophil death»

Anna Letko, PhD in Computational Biology (May 17) Institute of Genetics, Vetsuisse Faculty Bern (Prof. Cord Drögemüller) «Molecular characterization of rare forms of canine neurological diseases as potential models for similar human diseases»

Martin Liptay, PhD in Immunology (October 1) Institute of Animal Pathology, Vetsuisse Faculty Bern (Prof. Sven Rottenberg) «Replication fork remodeling and PARP inhibitor resistance in Brca1/2-mutated mouse mammary tumors»

Yuanzhen Liu, PhD in Biomedical Sciences (April 8) Institute of Bee Health, Vetsuisse Faculty Bern (Prof. Peter Neumann) «Evolutionary genomics of an invasive species: the small hive beetle, Aethina tumida Murray (Coleoptera: Nitidulidae)»

Laurent Pascal Georges Lejeune, PhD in Biomedical Engineering (April 19) ARTORG Center / AIMI, Medical Faculty (Prof. Raphael Sznitman) «Annotating Medical Sequences in the Blink of an Eye: Segmentation of Video and Volumetric Medical Sequences at Framerate using Sparse Point-wise Supervision »

Marta Lewandowska, DVM PhD (Doctor of Veterinary Medicine and Philosophy) (November 10) Institute of Virology and Immunology IVI, Vetsuisse Faculty Bern (Prof. Artur Summerfield) «Exploring species tropism of zoonotic Flaviviruses in vitro»

Alessio Loffreda, PhD in Biochemistry and Molecular Biology (December 14) Institute of Biochemistry and Molecular Medicine, Faculty of Medicine (Prof. Peter Bütikofer) «Role of CLDP43 in cardiolipin homeostasis and identification of the ethanolamine phosphotransferase complex in Trypanosoma brucei»

Eleonora Lupi, PhD in Biomedical Sciences (September 29)

Institute of Anatomy, Medical Faculty (Prof. Dr. Nadia Isabel Mercader Huber, Dr. Jochen Gehring) «Establishment of a zebrafish screening assay for the identification of compounds affecting proepicardial and epicardial formation»

Μ

Lijuan Ma, PhD in Biomedical Sciences (June 22)

Department for BioMedical Research (DBMR), Faculty of Medicine (Prof. Christoph Müller) «The Role of EMT in the Alteration of Hormone Response in Endometriotic Lesions and its Contribution to the Recurrence of Endometriosis»

Alberto Mattei, PhD in Cell Biology (September 1) Institute of Cell Biology, Faculty of Science (Prof. Oliver Pertz) « Exploring Signaling Mechanisms regulating genetic and non-genetic Drug Resistance in Melanoma »

Anjani Kumar Maurya, PhD in Biomedical Engineering (March 11) ARTORG Center for Biomedical Engineering, Medical Faculty (Prof. Alex Dommann) «Multiscale structural decoding of fibers and designing responsive nanofibrous materials»

Josep Maria Monné Rodriguez, DVM PhD (Doctor of Veterinary Medicine and Philosophy) (May 4) Institute of Veterinary Pathology, Vetsuisse Faculty Zurich (Prof. Anja Kipar) «Feline hypertrophic cardiomyopathy: an out-of-hand cardiac remodelling scenario?»

Julia Moor, PhD in Biomedical Sciences (September 1) Institute for Infectious Diseases, Faculty of Medicine (PD Dr. Markus Hilty) «Resistome and microbiota in Swiss pig farms: a One Health study»

Arrigo Moro, DVM, PhD (Doctor of Veterinary Medicine and Philosophy) (September 7) Institute of Bee Health, Vetsuisse Faculty Berne (Prof. Peter Neumann) «Coevolution between ectoparasitic mites Varroa destructor and honey bee hosts, Apis mellifera»

Rebeca Mozún Torríco, Doctor of Medicine and Philosophy (MD, PhD) (May 21) Institute of Social and Preventive Medicine, Medical Faculty Bern (Prof. Claudia Kühni) «Respiratory epidemiology of schoolchildren in Switzerland: symptoms, risk factors and lung function»

Francis Muchaamba, DVM PhD (Doctor of Veterinary Medicine and Philosophy) (December 17) Institute for Food Safety and Hygiene, Vetsuisse Faculty Zurich (PD Dr. Taurai Tasara) «Exploring phenotypic and genomic diversity and the functional roles of cold shock proteins in Listeria monocytogenes»

Annelies Kathrin Müller, PhD in Biomedical Sciences (December 17) Institute for Infectious Diseases, Medical Faculty (PD Dr. Lucy Hathaway) «Virulence of Pneumococcal Serotypes in Human Meningitis»

Catrina Mugglin, Doctor of Medicine and Philopshy (MD, PhD) (June 2) ISPM, Medical Faculty (Prof. Matthias Egger, Prof. Olivia Keiser) «From acute to chronic - HIV care in the era of widely available antiretroviral therapy in low resource settings»

Ν

Pascal Näf, PhD in Immunology (May 31) Department for BioMedical Research (DBMR), Medical Faculty (Prof. Adrian Ochsenbein) «The Role of IL 33/ST2 Signaling in Hematopoiesis and Myeloid Leukemia»

Samara Lauren Naim, PhD in Biomedical Sciences (August 20) Institute of Pharmacology, Faculty of Medicine (Prof. Thomas Kaufmann) «Towards understanding the physiological and pathophysiological roles of he BCL-2 family member BOK»

Nicolas Jan Niklaus, PhD in Cell Biology (June 28) Institute of Pathology, Faculty of Medicine (Prof. Mario Tschan) «The versatile role of alternatively spliced DMTF1 isoforms in breast and prostate cancer & The function of PU.1 in alternative splicing of CFLAR in acute myeloid leukemia»

\mathbf{O}

Maria Otth, Doctor of Medicine and Philosophy (MD, PhD) (March 11) ISPM, Faculty of Medicine (Prof. Claudia Kühni) «Pulmonary disease, its risk factors and necessity for long-term follow-up care in childhood cancer survivors»

Özen Özhan, PhD in Biomedical Engineering (October 25) ARTORG Center for Biomedical Engineering Research, Medical Faculty (Prof. Laura Marchal Crespo) «Intelligence, Adaptation and Automation of Robotic Training for Motor Learning and Neurorehabilitation»

Ρ

Shuang Peng, PhD in Immunology (November 15) Institute of Pharmacology, Medical Faculty (Prof. Hans-Uwe Simon) «RHOH is a negative regulator of neutrophil effector functions»

Carlos Pulido Quetglas, PhD in Biomedical Sciences (August 31) Department for BioMedical Research (DBMR), NCCR RNA & disease, Medical Faculty (Prof. Rory Johnson) «Accurate candidate selection for improved CRISPR library designs of long noncoding RNAs»

Sreoshee Rafiq, PhD in Cell Biology (December 17) Institute of Pathology, Medical Faculty (Prof. Mario Tschan) «Lysosomes and lysosomal degradation in acute myeloid leukaemia therapy»

Katrina Rosenberger, PhD in Biomedical Sciences (August 23) Centre for Proper Housing of Ruminants and Pigs, Agroscope, Tänikon, Vetsuisse Faculty Bern (Dr. Hanno Würbel, Dr. Nina Keil)

«The effects of long-term cognitive training on the behaviour and welfare of goats» Top of page

GRADUATIONS

S

Federico Saltarin, PhD in Biomedical Sciences (December 10) Theodor Kocher Institute, Faculty of Science (Prof. Ruth Lyck) «Investigations on the extravasation of melanoma cells across the blood brain barrier.»

Guerric Pierre Benedikt Samson, PhD in Cell Biology (November 29) Biotechnology Institute Thurgau (BITg), Medical Faculty (Prof. Daniel Legler) «The role of flotillin-2 in immune cell migration»

Carmen Alexandra Nadine Sautter, Doctor of Veterinary Medicine and Philosophy (DVM, PhD) (March 11) Institute of Virology and Immunology, Vetsuisse Faculty (Prof. Arthur Summerfield) «Towards understanding humoral and cellular immune responses against the porcine reproductive and respiratory syndrome virus»

Olivier Pascal Schären, PhD in Immunolgy (June 18) Institute for Infectious Diseases, Medical Faculty (Prof. Siegfried Hapfelmeier) «Investigation of immunogenicity and microbiota interaction of cell wall metabolite auxo-trophic Salmonella»

Dominic Manuel Schärer, PhD in Biomedical Sciences (May 28) University Institute of Clinical Chemistry, Medical Faculty (Prof. Carlo Largidièr) «Fluoropyrimidine toxicity: hunting the missing heritability using a phenotyping approach»

Kristina Seiler, Doctor of Medicine and Philosophy (MD, PhD) (August 22) Institute of Pathology, Faculty of Medicine (Prof. Mario Tschan) «Novel non-canonical functions of metabolic enzymes HK3 and FASN in leukemic myeloid differentiation»

Anita Senk, PhD in Biomedical Sciences (December 13) Institute of Anatomy, Medical Faculty (Prof. Valentin Georgiev Djonov «Alternative mechanism of blood vessel formation during zebrafish caudal fin regeneration»

Andrea Spiri, Doctor of Veterinary Medicine and Philosophy (DVM, PhD) (November 2) Clinical Laboratory, Department of Clinical Diagnostics and Services, Vetsuisse Faculty Zurich (Prof. Dr. Regina Hofmann-Lehmann)

«An Independent View at Vaccine Immunity and Environmental Contamination in Feline Calicivirus Infection»

Yannick Raphael Suter, PhD in Biomedical Engineering (April 14) ARTORG Center for Biomedical Engineering Research, Medical Faculty (Prof. Mauricio Reyes) «Advanced Machine Learning Technologies for Robust Longitudinal Radiomics and Response Assessment in Glioblastoma Multiforme»

Т

Katayoun Taghavi, Doctor of Medicine and Philosophy (MD, PhD) (August 11) Institute of Social and Preventive Medicine, Faculty of Medicine (PD Dr. Julia Bohlius) «Secondary prevention of cervical cancer in low- and middle-income countries»

Ye Tang, PhD in Biomedical Engineering (June 28) ARTORG Center for Biomedical Engineering Research, Faculty of Medicine (Prof. Olivier Guenat) «Nanocellulose applications in biosensing devices» Maximilien Victor Tholl, PhD in Biomedical Engineering (March 31) sitem Center for Translational Medicine and Biomedical Entrepreneurship, Medical Faculty (PD Dr. Andreas Häberlin, Prof. Hildegard Tanner)

«Intracorporal energy harvesting for cardiovascular implantable electronic devices»

Meng Tian, Doctor of Medicine and Philosophy (MD, PhD) (August 19) Department of Ophthalmology, University hospital, Faculty of Medicine (Prof. Marion Munk, Prof. Sebastian Wolf) «Evaluation of Retinal and Ocular Inflammation Diseases Using Swept Source Optical Coherence Tomography Angiography»

Louis Jean François Tirot, PhD in Biochemistry and Molecular Biology (December 15) Institute of Plant Sciences, Faculty of Science «Characterization of novel regulators of DNA methylation during reproduction in Arabidopsis thaliana»

Igor Tockarchuk, MD, PhD (Doctor of Medicine and Philosophy), (September 3) Institute of Pathology, Medical Faculty (Prof. Mario Tschan) «The Impact of Autophagy On Breast Cancer Cell Plasticity And Viability»

Thao Thi Nhu Tran, PhD in Biochemistry and Molecular Biology (June 23) Institute for Virology and Immunology, Vetsuisse Faculty Bern (Prof. Volker Thiel) «Establishment of a reverse genetics platform for emerging RNA viruses»

Verdiana Trappetti, PhD in Biomedical Sciences (November 4) Institute of Anatomy, Medical Faculty (Prof. Valentin Georgiev Djonov) «Synchrotron Microbeam Radiation Therapy for the treatment of lung cancer and melanoma»

V

Maria Vasiloglou, PhD in Biomedical Engineering (October 27) ARTORG Research Center for Biomedical Engineering, Medical Faculty (Prof. Dr. Stavroula Mougiakakou, Prof. Dr. med. Zeno Stanga)

«User-perspectives and validation of AI-based dietary monitoring and assessment systems»

Tommaso Virgilio, DVM PhD (Doctor of Veterinary Medicine and Philosophy) (December 17) Institute for Research in Biomedicine IRB, Medical Faculty (Dr. Santiago F. González) «The effect of the inflammatory reaction on the lymphatic metastasis of melanoma»

W

Nicolas Waespe, Doctor of Medicine and Philosophy (MD, PhD) (September 2) Institute of Social and Preventive Medicine, Faculty of Medicine (Prof. Claudia Kuehni) « Heritable risk factors for health complications in childhood cancer »

Christoph Wenger, PhD in Biochemistry and Molecular Biology (July 28) Department of Chemistry, Biochemistry and Pharmaceutical Sciences, Faculty of Science (Prof. André Schneider) «The mitochondrial protein import system in Trypano-soma brucei and what it tells us about the evolution of eukaryotes»

Anna Silvia Wenning, PhD in Biomedical Sciences (July 30) Department for Biomedical Research, Faculty of Medicine (Prof. Andrew MacPherson, Dr. Mercedes Gomez de Agüereo) «The Maternal Microbiota Drives Embryonic Epidermal Development and Configurates Neonatal Skin Barriers»

GRADUATIONS

Nicolas Wenk, PhD in Biomedical Engineering (December 17) ARTOG Center, Medical faculty (Prof. Laura Marchal Crespo) «First-person immersive virtual reality to improve motor learning and neurorehabilitation»

Jakob Winter, DVM PhD (Doctor of Veterinary Medicine and Philosophy) (December 16) Veterinary Public Health Institute, Animal Welfare Division, Vetsuisse Faculty Bern (Prof. Hanno Würbel) «Piling behaviour of laying hens - origin and contributing factors»

Pablo Arnold Winzer, PhD in Immunology (May 4)

Institute of Parasitology, Vetsuisse Faculty Bern (Prof. Andrew Hemphill) «Molecular changes of Neospora caninum treated with the calcium dependent protein kinase 1 inhibitor BKI-1294 and implications on the immune response»



Y

Ζ

Xingshuo Zhang, PhD in Biomedical Sciences (March 19) Department of Biomedical Research (DBMR), Faculty of Medicine (Prof. Benjamin Gantenbein) «Tissue-Specific Progenitor Cells Of The Intervertebral Disc – Rare Cells With Big Potential For the Cure of Low Back Pain? »

Joel Zindel, PhD in Immunology (December 17)

Department for BioMedical Research (DBMR), Medical Faculty (Prof. Daniel Candinas, Prof. Deborah Keogh-Stroka) «Peritoneal macrophage aggregation and EGFR-dependent mesothelial to mesenchymal transition: novel therapeutic avenues for peritoneal adhesions»

Kathrin Zürcher, PhD in Biomedical Sciences (October 25)

Institute of Social and Preventive Medicine, Medical Faculty (Prof. Dr. med Matthias Egger and Prof. Dr. med Lukas Fenner) «Tuberculosis among people living with and without HIV in lower-income countries: Transmission, Resistance, Mortality»

GCB AWARD FOR BEST THREE THESES 2021*

*Awarded at the January 27, 2022 GCB Symposium

JULIA BRUGGISSER

Institute of Animal Pathology

Supervisor

Prof. Dr. Horst Posthaus Institute of Animal Pathology Vetsuisse Faculty of the University of Bern

Mentor

Prof. Dr. Andrea Gottardi Clinic of Visceral Surgery and Medicine, Hepatology University Clinic, Inselspital Bern Faculty of Medicine of the University of Bern

Co-advisor

Prof. Dr. Britta Engelhardt Theodor-Kocher-Institute Faculty of Medicine of the University of Bern

AWARDS & RECOGNITION



ABSTRACT

Clostridium Perfringens β-Toxin Receptor Identification and Oligomer Structure

Bacterial infections are a leading cause of morbidity and mortality. The usual method of treating bacterial infections is by local or systemic administration of antibiotics. Excessive use of antibiotics, however, has fostered the rise of multidrugresistant pathogenic bacteria, which nowadays represents a major problem worldwide. A common denominator of most pathogenic bacteria, including drug-resistant strains, is that they employ pore-forming toxins (PFTs) as virulence factors. These protein toxins, secreted as water-soluble monomers from the bacteria, bind to target cells via membrane receptors and damage them by inserting into cell membranes as oligomeric pore-complexes. Because of their nearly universal presence in bacterial pathogens, PFTs are a unique and important target for research into novel, broadly applicable

antimicrobial prophylactics and therapeutics. Clostridium perfringens is one of the most widely distributed and successful pathogens. It causes multiple severe diseases in animals and humans and produces an impressive arsenal of toxins with pore forming properties, most of them belonging to the hemolysin-like family of β-PFTs. The current knowledge regarding this bacterium and the mode of action of its toxins is still poorly defined. One of the most potent toxins produced by C. perfringens is the hemolysin-like β-PFT beta-toxin (CPB). This toxin is the main virulence factor of type C strains and essential for the development of a fatal necrotic enteritis in humans and newborn animals. CPB contributes to disease by inducing endothelial and thrombocyte damage, resulting in vascular leakage, hemorrhage and most likely altered hemostasis. Endothelial cells, platelets and several leucocytic cell lines are known to be highly sensitive to the toxin. The molecular basis of this unique cell type specificity, unknown to other members of the hemolyins-like β-PFT, remained elusive. We hypothesized that the narrow cell type specificity of CPB relates to a plasma membrane receptor that is expressed in endothelial cells, leukocytes and platelets, but absent from most other cells. In this PhD thesis, we determined the molecular basis for the cell-type specificity of CPB by showing that CD31, an endothelial, thrombocytic and leukocytic adhesion molecule, serves as the cellular receptor for CPB. Moreover, we mapped the toxin binding site to a specific region in the extracellular part of this cell type specific membrane molecule. By identifying CD31 as the cellular receptor on endothelial cells, we uncovered the molecular basis of the high cell type specific activity of CBP. Our data show that the interaction with the Ig6 domain of CD31 is needed for CPB toxicity and suggest that CD31 is part of a CPB pore forming complex. CPB possesses unique features within the family of hemolysin-like β-PFTs that can now be explained by the specific engagement with its cellular receptor. The strict requirement for one protein VIII receptor (CD31) for pore forming activity in membranes raised further guestions about the structural determinants of the toxin specificity. Due to the lack of data on CPB structure, the previously available information did not allow to draw a detailed picture on the structural and functional determinants underlying target cell specificity and cytotoxic effects of CPB. We therefore extend the work on investigating the structure of the CPB pore complex. To this purpose, we investigated the phenomenon that CPB spontaneously forms oligomeric complexes in solution at higher concentrations. Indeed, we were able to determine the cryo-EM structure of CPB in styrene maleic acid (SMA) discs, which is highly likely to represent the membraneinserted pore form, at near atomic resolution. In contrast to all currently reported homocomponent β-PFT, CPB forms a pore with a similar architecture as the hetero-octameric pores of the bi-component S. aureus leukocidins. Interestingly, we identified another unique feature: the CPB oligomer forms an N-terminal β-barrel protrusion, that has not been reported in any PFT thus far. This newly discovered structural element of a β-PFT may influence pore stability and channel forming properties and makes the pore particularly attractive for macromolecule sensing. Overall, the results of this PhD thesis provide a major breakthrough in the field of research on bacterial, and in particular clostridial pathogenesis. This gain of knowledge on the structure and function of CPB opens future perspectives for research on a major class of bacterial virulence factors. For example, it can be used for the rational engineering of toxin-derived molecules for novel therapeutic applications. This includes the design of novel immunoprophylactic strategies covering multiple pathogens, which rely on PFTs to damage their hosts. In addition, our results may help the identification of compounds, which interfere with the assembly or function of PFTs and therefore may serve as a basis for new anti-bacterial therapies. Another option is the design of novel PFT-based effector molecules to target specific cells, e.g. cancer cells, or to use as bio-nanopore sensors. Hence, I expect that these discoveries will be useful to guide further studies to fight bacterial infections.

Photo Julia Bruggisser presentation

AWARDS & RECOGNITION



Photo Michel Fasnacht presentation

MICHEL FASNACHT

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ABSTRACT

Functional Characterization of the Dynamic Post-Transcriptional 23S rRNA Modification ho⁵C2501 in *Escherichia coli*

The ribosome is an enormous molecular machine consisting of both several ribosomal RNA (rRNA) molecules and a plethora of ribosomal proteins. However, at the core the ribosome is a ribozyme, catalysing the peptide bond synthesis between amino acids to synthesize new proteins. Like all other types of RNA molecules, rRNA nucleosides can be posttranscriptionally modified. One of the best studied model organisms for rRNA modifications is the gram-negative bacterium *Escherichia coli*. Our current understanding of rRNA modifications in *E. coli* is thus first extensively reviewed in the introductory chapters. As will be shown, all but one modification enzymes that introduce a post-transcriptional rRNA modification into *E. coli* ribosomes have been identified. The most recently identified modification enzyme is RlhA, which was shown to be responsible for a peculiar 23S rRNA modification termed ho⁵C2501.

Co-advisor

Prof. Dr. Torsten Ochsenreiter

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Our knowledge of this rRNA modification is limited. Previously it has been shown that ho5C2501 modifications are added in a growth phase dependent manner to the *E. coli* ribosome, with the modification frequency increasing towards the stationary phase. Additionally, an iron dependency has been identified for RIhA activity. Otherwise, any functional roles are unknown.

This PhD thesis thus explores and characterizes the role of the post-transcriptional modification ho5C2501 in translation and for the cellular fitness under different stress conditions. In so doing, this work demonstrates a need for the tight regulation of the ho⁵C2501 modification frequency in unstressed *E. coli* cells, as the modification has the potential to slow down translation. Furthermore, under oxidative stress conditions, this work finds one of the strongest growth retardation phenotypes ever described for the deletion of an rRNA modifying enzyme in *E. coli*. This phenotype is further linked to a lack of the DNA protective protein Dps. Additionally, it is shown how the ho⁵C2501 modification has a detrimental effect on cellular fitness at increased temperatures. Finally, these findings are discussed in the context of the extremophilic bacteria *Deinococcus radiodurans* and *Thermus thermophilus*, which, respectively, have their corresponding C2501 residue stoichiometrically modified or are completely devoid of any modification at the corresponding nucleotide.

AWARDS & RECOGNITION



KATHRIN ZÜRCHER

Institute of Social and Preventive Medicine (ISPM)

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ABSTRACT

Tuberculosis among people living with and without HIV in lower-income countries: Transmission, Resistance, Mortality

Tuberculosis (TB), an airborne disease caused by the bacterium Mycobacterium tuberculosis (Mtb), is one of the most deadly infectious diseases, with an estimated 100 million newly diagnosed TB cases and 1.4 million deaths per year worldwide. The HIV pandemic and the emergence of drug-resistant Mtb strains are the main challenges to TB control, especially in low-and middle-income countries. HIV infection induces immunodeficiency and is a decisive risk factor for TB. With the significant scale-up of antiretroviral therapy (ART) for people living with HIV (PLHIV), their prognosis has improved and reduced TB incidence in this population. Nevertheless, the risk of TB in PLHIV on ART remains higher than in people without HIV. In addition, the diagnosis of TB in PLHIV is more challenging due to the reduced occurrence of lung cavitation and lower bacterial load in the sputum compared to HIV-negative people. The rising number of drug-resistant TB is another threat to the control of TB. To prevent drug-resistant TB, strategies such as surveillance, access to comprehensive drug susceptibility testing (DST), rapid treatment initiation and treatment completion with an appropriate regimen are still lacking in many low-and middle-income countries. In this thesis, I explore different aspects of the epidemiology of TB, especially drug-resistant TB in PLHIV and HIV-negative people seeking care in low-and middle-income countries. I will focus on Mtb transmission, the management of TB in adults (age ≥16 years) from diagnosis to treatment and clinical outcomes, and the evolution of drug-resistant Mtb and the clinical consequences.

In chapter 1, I provide an introduction to TB. I describe the global burden of TB, the pathogen and the course of infection, the genetic diversity of TB, the diagnosis of TB including DST and the treatment of pan-susceptible and drug-resistant TB. In addition, I describe the current challenges to the control of TB. Chapter 3 and chapter 4 focus on the transmission of Mtb at a primary care clinic in South Africa using a novel approach. Paper 1 is the study protocol, which describes the range of collected patient and environmental-associated data in detail. In paper 2, I showed that the risk of Mtb transmission increased with the presence of young adults and higher room humidity at the primary care clinic. During a clinic visit of one hour, the risk of infection was between 3-5% and increased to 9-29% for patients with monthly visits.

Chapter 5 and chapter 6 focus on the management of TB in adult PLHIV at ART clinics in low-and middle-income countries. In paper 3, I analysed clinical data of 2,695 adult PLHIV who developed TB, of whom 1,930 (71.6%) had pulmonary TB, and 765 (28.4%) had extra-pulmonary TB. I demonstrated the difficulties in obtaining bacteriological confirmation in PLHIV who also had pulmonary TB or extra-pulmonary TB (52% and 42%). I found no association between the increased mortality in PLHIV and the type of TB they developed (extra-pulmonary or pulmonary). I showed that bacteriological confirmation was associated with reduced mortality in PLHIV who had pulmonary TB or extra-pulmonary TB than PLHIV with a negative diagnostic result. Paper 4 used site-level data to study the integration of multidrug-resistant TB (MDR-TB) services at 29 ART clinics. I show that 14 (48%) ART clinics reported full MDR-TB services on-site, nine (31.0%) reported partial integration, and six (21%) had access to off-site MDR-TB services only. I demonstrated that the 22 clinics with on-site molecular DST could identify drug resistance to first-line drugs but rarely to second-line drugs. In addition, I showed that ART clinics with full integration of MDR-TB services were more likely to prescribe individualised MDR-TB treatment compared to off-site services.



Photo Kathrin Zürcher presentation

Co-advisor: Prof. Dr. Otto Schoch Faculty of Medicine of the University of Zurich

Mentor: Prof. Dr. Gertraud Schüpbach Veterinary Public Health Institute Faculty of Vetsuisse of the University of Bern

AWARDS & RECOGNITION

Johanna Dürmüller-Bol DBMR Research Award 2021

Awarded to 2021 GCB Graduate, **Dr. med. Joel Zindel** for his project "Defining macrophage-dependent mesothelial cell recruitment in peritoneal injury repair and adhesion formation"

MD-PHD GRANTS

The National MD-PhD Program, which is supported by the Swiss National Science Foundation (SNSF), the Swiss Academy of Medical Sciences (SAMS), and several private foundations, awards a limited number of competitive individual grants every year in Human Medicine, Veterinary Medicine and Dentistry to outstanding candidates, with residency in Switzerland.

In 2021 Swiss Academy of Medical Sciences (SAMS) granted fellowship to the following recipients:

Student: Morgane Francine Decollogny Supervisor: Prof. Dr. Sven Rottenburg Institute of Animal Pathology

Student: Manuel Egle Supervisor: Prof. Dr. Sarah Henning Longnus, PD Dr. Lucio Barile Clinic of Cardiovascular Surgery, Inselspital

FACTS & FIGURES 2021



Graduates Faculty Distribution



Graduates by Expert Committee 2021



Degree Titles by Faculty 2021

2021 Degree Titles	Faculty of Medicine	Faculty of Science	Vetsuisse Faculty BE	Vetsuisse Faculty ZH	Affiliated Institutions*	Title Total
MD,PhD	15					15
DVM,PhD			5	5	1	11
PhD in Biomedical Engineering	14					14
PhD in Biomedical Sciences	17	1	6			24
PhD in Immunology	11		2		1	14
PhD in Neuroscience	3		1			4
PhD of Science in Biochemistry and Molecular Biology	7	6	7			20
PhD of Science in Cell Biology	4	4	2		1	11
PhD in Computational Biology		1	3			4
Total	71 (61%)	12 (10%)	26 (22%)	5 (4%)	3 (3%)	117 (100%)

*AO Foundation, Davos (1) and Robert Mathys Foundation, Bettlach (1)

FIVE YEAR FIGURES (2017 - 2021)

GRADUATES GENDER











As requested by the University of Bern, the GCB undertook and completed a self-assessment (May through October). The final report was submitted and approved by all three faculties between November and December 2021.

The remit was to "...take stock of the current situation and to conduct a critical review of the quality of the graduate school." The aim is to "improve and further develop the graduate school (GCB) by discerning its strengths and weaknesses...and identifying challenges, as well as potential for development. This process required the GCB to "involve" and "interview" representatives from the relevant status groups or stakeholders (management, coordination, teaching, supervisors, doctoral students, administrative and technical staff, external bodies).

The existing GCB administrative staff took on the responsibility to plan, prepare, execute, and analyze the self-assessment internally with existing staff. The project timeline was established.



analysis

Committee

Stakeholders were identified and grouped as shown in the following table:

Grouping	Stakeholders
Management	Management (PhD Committee)
Peers / Teaching Staff	Mentors, Supervisors, Co-Advisors, Teaching Staff,
Students	Current and graduated GCB Students (2016 – present)
External Co-Referees*	External Co-Referees
External Partners*	BeNeFri, SSPH+, specialization PhD
Administrative & Technical Staff*	IT teams – KSL, ILIAS, doctoral database, ILUB, specific individuals with whom we regularly interact, exchange information, etc.

A targeted (specific to the stakeholder group) survey was prepared and sent to each survey group. Categories of interest were identified as: Research, Scientific Integrity, Practical application of knowledge and understanding (methodology), problem solving (analysis) and evaluation (e.g., sources), interdisciplinary academic skills (soft skills), science organization, science presentation and communication.

The survey questions were developed for each category were organized to solicit responses to learn more about: You (respondent), study situation, doctoral program, study program, structure and content of the study program, scholarly activities/ skills, interdisciplinarity and relevance, program experiences, support and service, access to resources and infrastructure, readiness for employment, overall quality of the GCB program, safety from harassment, bullying, quality of life, in your own words, overall impression, technical / survey issues.

The surveys were created in Survey Monkey and Invitations for participation were sent by email. While the survey was being conducted, internal data (e.g., financial and other key indicators) were compiled for analysis and reporting. Furthermore, personto-person interviews were conducted. A cross-selection of students and faculty were invited for interviews.

The following summarizes the foci, as well as the goals the key areas to address over the subsequent four years that must be addressed so the GCB can continue to promote itself as an internationally competitive, multidisciplinary excellent quality doctoral program.

- Raise visibility: Improve our efforts to raise the graduate school's visibility, reach out to current students as well as to be more noticeable as a graduate school on the national and international level to prospective students.
- Actively Recruit: be an actively recruiting graduate school with the intent to seek out and attract top PhD candidates.
- Explore: funding sources for PhD fellowships and pursue new national and international partnerships.
- Expand cutting-edge training: Meet the growing need for training course platforms to address the number of new and cutting-edge research fields, such as artificial intelligence, digital analysis and microbiomics, metabolomics analysis, etc.
- Increase offerings in translational techniques and research, computational analysis, and transferrable skills through new courses or partnerships.
- PhD students, to educate them in their responsibilities towards their students with respect to employment and coaching.
- Balance mentors-to-students ratio to 1:5: This has proven to be a successful formula that provides sufficient time for enough support for each student (even in case of difficulties such as those experienced during the pandemic).
- Increase networking opportunities: To enhance scientific exchange between students, we will aim to establish more such opportunities in all three participating faculties, grouped according to the topic of interest.
- Embrace social media: Launch social media presence on LinkedIn.
- Optimize process and administrative support: Create and implement an eLearning program and streamlined processes to facilitate compliance with the GCB administrative processes to further support students, supervisors, co-advisors, mentors and teaching staff.

Train young group leaders: Offer an introductory training for young group leaders and new mentors, who are first supervising

The GCB would like to thank all its partners and collaborators. Particularly, we thank:

The University of Bern Leadership and Deans of the three GCB Faculties of Medicine, Science and Vetsuisse. that jointly administer the graduate school. The support the graduate school receives allows the GCB administration and partners to continue to offer excellence throughout its structured graduate program. Virginia Richter, Vice Rectorate for Development and Marco Hollenstein, Office of the Vice Rectorate for Development took time to work with GCB leadership to discuss continued development and growth plans. Further their direction and expertise throughout the GCB's first self-assessment process, resulted in a more robust and useful report that can now be used as a guide to continue the process begun in 2021.

The GCB PhD Committee for their support that continued without disruption due to the Covid-19 pandemic and despite of the many challenges the graduate school faced in 2021. It is a credit to the committee that their practical approach to problem-solving and decisiveness as a team, the GCB could continue to maintain its daily business, welcome 127 new students, graduate 117 students and navigate myriad difficult situations with successful outcomes. The committee's support made the first ever fully virtual symposium a possibility. Instead of having to cancel the highly anticipated and valued annual event, the symposium could not only be held online, but with resounding success.

Tobias Nef and Stephan Gerber from ARTORG Center for Biomedical Engineering Research for agreeing to take on and take over the planning of the virtual GCB Symposium 2021 in the final weeks of 2020. Without your efforts, the GCB PhD Committee faced the decision of potentially having to cancel the GCB Symposium due to the pandemic. Your proposal to provide not only a virtual option, but a robust one that allowed staff and students to look forward to this fundamentally important and integral part of the GCB.

The GCB PhD students who have rallied and continued with their research and studies in spite of the additional mchallenges presented to them in the form of a pandemic. Navigating lab closures, switching between presence and virtual courses, meetings, and symposia while continuing to persevere with positivity demonstrates the commitment and the caliber of our students. The GCB is also grateful and thankful to all the students who share their perspective and experience in effort to help the GCB remain relevant to this cohort and those yet to join the graduate school.

Rafaelle Battaglia and the Institute of Social and Preventive Medicine (ISPM) IT Support team for their unflappable support throughout staff and equipment changes, as well as with the increased challenges supporting employees working from Home Office. Despite the at times unstable internet connections, varying levels of IT-literacy, and many urgent requests, you have kept us in business and prevented us from having serious work-stoppages due to IT challenges.

Barbara Järmann of IBMM for supporting the GCB in all matters concerning the Bridge Program and supporting is in all questions relating to "Bridge".

41

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