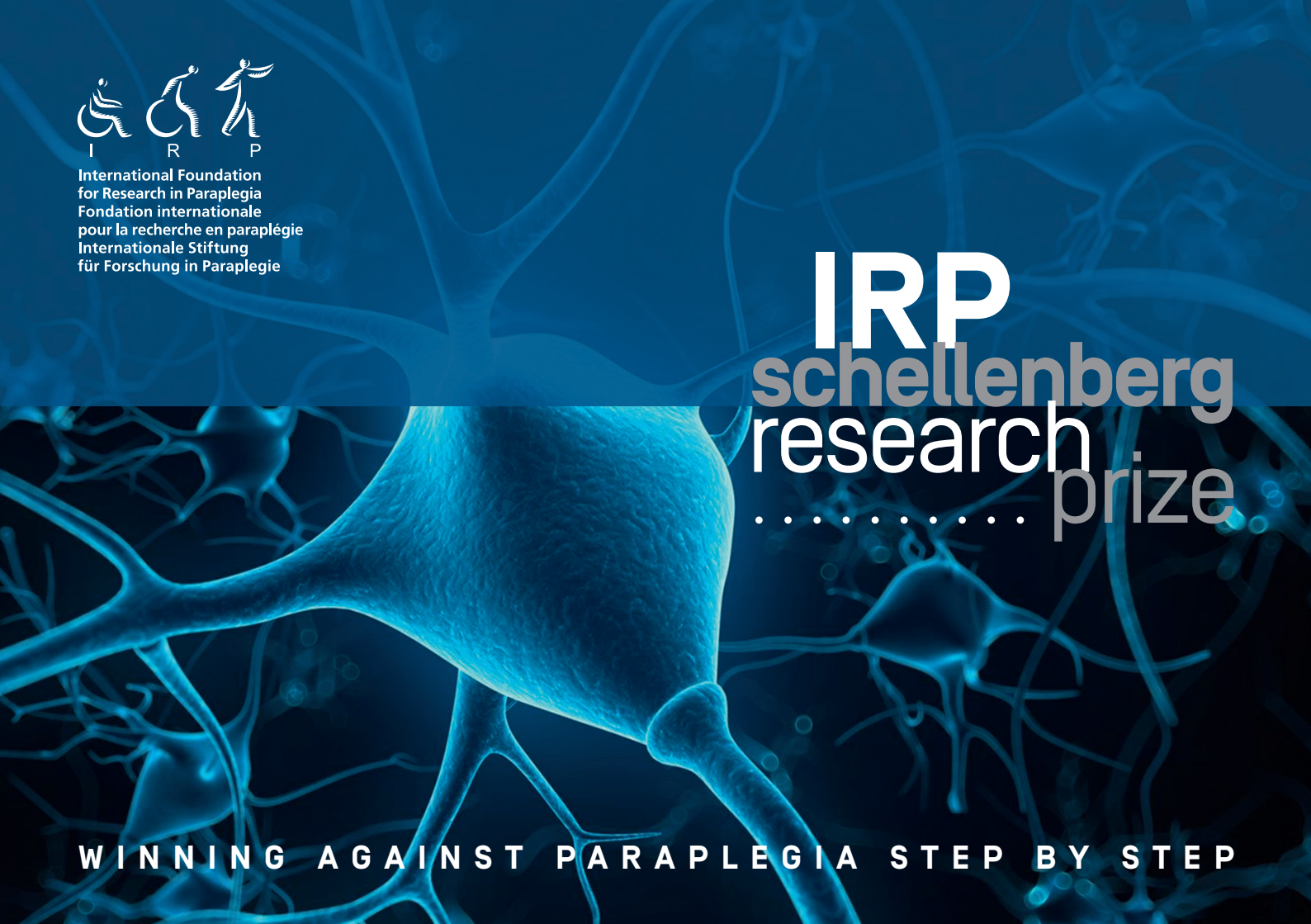
I R P
International Foundation
for Research in Paraplegia
Fondation internationale
pour la recherche en paraplégie
Internationale Stiftung
für Forschung in Paraplegie
IRP
schellenberg
research
prize
WINNING AGAINST PARAPLEGIA STEP BY STEP

# SUMMARY

Since 1995, the IRP - International Foundation for Research in Paraplegia - has undertaken fundraising activities for financing the best basic and clinical research projects worldwide in the field of paraplegia, selected by the IRP Scientific Committee of international experts.

**IRP has helped to fund more than 150 research projects in Switzerland and abroad since it was founded, contributing over CHF 25,000,000 over 20 years.**

IRP has developed a partnership with FSP – Swiss Foundation for Paraplegics – until 2020 to finance clinical projects for CHF 500,000.- yearly.

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**IRP funds:**

- IRP Research Grant (up to 150,000.– over 2 years)
- IRP Post-doctoral Fellowship (up to 80,000.– over 1 year)
- IRP Schellenberg Research Prize (up to 100,000.– every 2 years)
- IRP *Professor Alain Rossier* Chair at the University of Geneva
- IRP *Spinal Cord Repair* Chair at the EFPL (Swiss Federal Institute of Technology) in Lausanne.

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There is one single objective driving our activities:

## WINNING AGAINST PARAPLEGIA STEP BY STEP

Progress in the field of neuroscience research also benefits patients suffering from other disorders of the central nervous system, such as Parkinson's disease, Alzheimer's disease, multiple sclerosis and stroke.

**www.irp.ch**

The booklet that you have in your hands reflects the painstaking research, editing and graphic design work that was put together in just a few weeks by the General Secretariat of the IRP and Fritz Vischer, a former member of the IRP Foundation Board, who himself is paraplegic.

But above all, it reflects the outstanding nature of some of the research projects funded by IRP, driven by passionate researchers and which are gradually enabling a better understanding of the regeneration mechanisms of the spinal cord and improving living conditions for paraplegics.

A pursuit of excellence that leads me naturally to thank the members of the IRP Scientific Committee for their commitment. This Committee is made up of international experts in the field of neurosciences, who every year select the most promising projects for funding in a most rigorous process.

IRP, which is a private foundation, is proud to be able to share through this publication its firm belief that through the committed involvement of everyone, researchers and donors, paraplegia will one day no longer be an irreversible destiny.

**Professor Theodor Landis**

President of the IRP Foundation

**The competition for the *IRP Schellenberg Research Prize* takes place every two years. It is awarded to researchers who, by the significance of their scientific contributions and their publications in scientific journals of renown, have furthered understanding of the development, lesion and regeneration processes relating to the spinal cord.**

Set up in 2003, the *IRP Schellenberg Research Prize* perpetuates the memory of Ulrich Schellenberg, the founder of the IFP Foundation in Zürich and co-founder of the IRP Foundation in Geneva, who died in 2001.

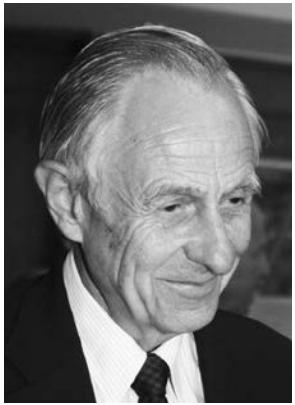
The Prize, up to CHF 100,000, is aimed at rewarding a scientist's outstanding work in the field of paraplegia. Priority is given to young but already established and successful scientists working experimentally in the above-mentioned fields. The funds awarded, by enabling the recruitment of new co-workers or personnel, and the purchase of equipment or supplies, should help investigate avenues that may, in due course, lead to progress in spinal cord regeneration and functional recovery.

IRP is proud to present in this brochure the

## IRP SCHELLENBERG RESEARCH PRIZE WINNERS

Women and men who are IRP Ambassadors around the world and the symbol of our committment to research in paraplegia.

**www.irp.ch**



Fifteen profiles, fifteen characters, fifteen scientific adventures: the following pages pay tribute to the 15 women and men researchers who have been recipients of the *IRP Schellenberg Research Prize* since it was founded in 2003.

Each one in their own chosen field has attracted the attention of the IRP Scientific Committee through the importance of their scientific contributions to paraplegia research, whether fundamental or clinical.

For a researcher, receiving an award such as the *IRP Schellenberg Research Prize* always comes with a special feeling because in addition to honouring tangible results achieved over several years, it also crowns a vision, approach and method that are unique to them as well as a team work.

As well as offering a financial package of 100,000 Swiss francs - one of the largest for a scientific prize, the *IRP Schellenberg Research Prize* also represents general recognition from one's peers.

**Professor Andreas Steck**

President of the IRP Scientific Commitee

2003

PROFESSOR

# JAMES W. FAWCETT

**BIO EXPRESS**

**Since 2000** Professor at the University of Cambridge; Director of Studies King's College; Chairman Cambridge Centre for Brain Repair (BRC)

**2003** First winner of the IRP Schellenberg Research Prize

**1981** PhD in Medicine

**1975** Medical Degree

## LAB DESCRIPTION

The *Fawcett* lab has three programmes.

### Reactivating plasticity

Plasticity is the ability of the nervous system to bypass injuries. After childhood plasticity decreases to a low level, and recovery from brain and spinal injury is poor. The lab has developed an enzyme treatment, *chondroitinase*, that releases the brakes on plasticity. Combined with rehabilitation this reactivated plasticity allows much improved recovery from spinal cord injury.

### Stimulating nerve fibre regeneration

After they mature, spinal cord nerve fibres lose their ability to grow, and when damaged they regenerate weakly. The lab has shown that this loss of growth ability is caused by the neuron directing growth molecules away from the nerve fibres. New treatments to transport growth molecules back into nerve fibres are being developed.

### Bladder control

The lab is developing a new electronic method to control bladder emptying after spinal cord injury.

Professor
**James W. Fawcett**

Great Britain

IRP schellenberg research prize 2003

## PUBLICATIONS – MILESTONES


**2015, Neuroscience**: Franssen EH, Zhao RR, Koseki H, Kanamarlapudi V, Hoogenraad CC, Eva R, Fawcett JW *Exclusion of Integrins from CNS Axons Is Regulated by Arf6 Activation and the AIS*.

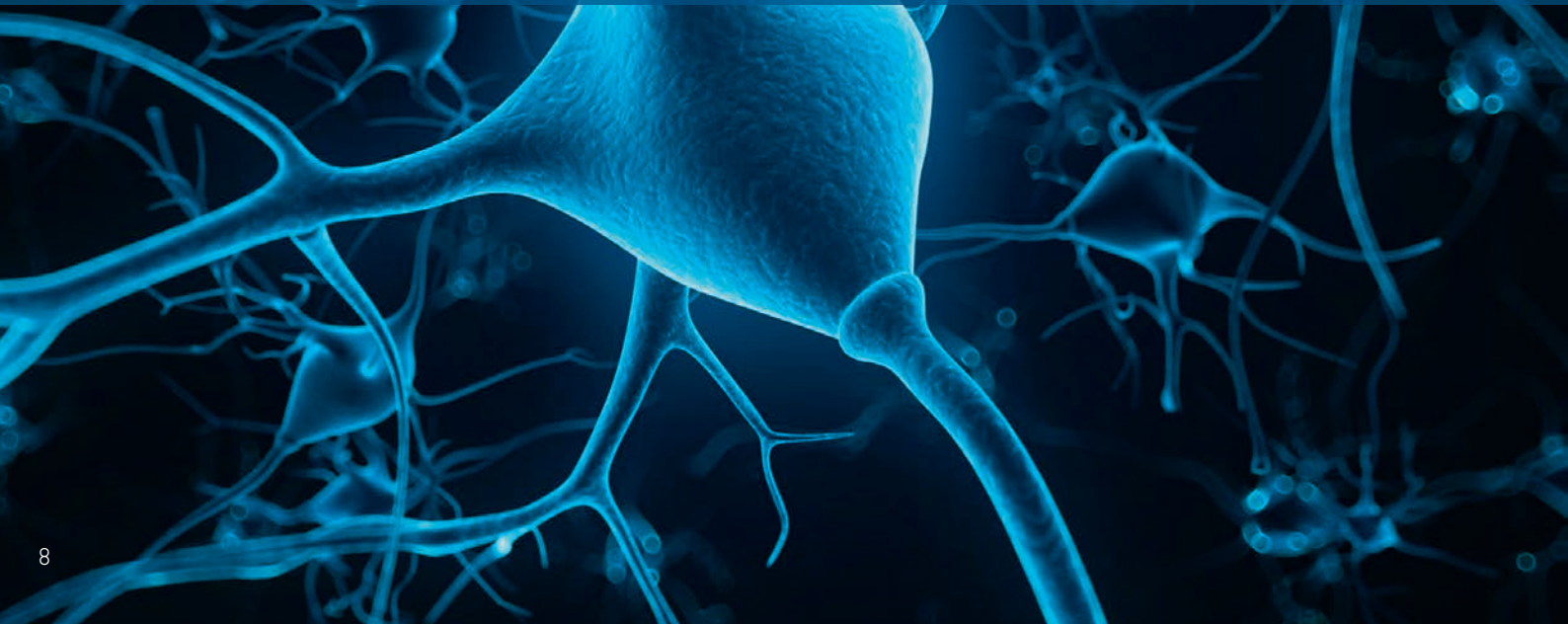
**2013, European Journal of Neuroscience**: Zhao RR, Andrews MR, Wang D, Warren P, Gullo M, Lisa Schnell L, Schwab ME, Fawcett JW
*Combination treatment with anti-Nogo-A and chondroitinase ABC is more effective than single treatments at enhancing functional recovery after spinal cord injury*.

**2013, Science Translational Medecine**: Chew DJ, Zhu L, Delivopoulos E, Minev IR, Musick KM, Mosse CA, Craggs M, Donaldson N, Lacour SP, McMahon SB, Fawcett JW
*A microchannel neuroprosthesis for bladder control after spinal cord injury in rat*.

2004

PROFESSOR

# OLE KIEHN



BIO EXPRESS

**2016** Professor in Neuroscience Karolinska Institute (KI), Stockholm

**2004** IRP Schellenberg Research Prize Winner

**2001** Group leader - KI

**1997-2001** Associate Professor - Københavns Universitet (KU), DK

**1995-2000** Hallas Møller Research Fellow - KU

**1990-1995** Group leader - KU

**1989-1990** Post-Doctoral Fellow, Cornell, USA

**1990** Dr. Sci. – KU

**1985** MD - KU

## LAB DESCRIPTION

Research in the *Kiehn* lab is directed to understand mechanisms by which neurons and neural networks operate to generate complex brain functions in particular movements in mammals.

*Kiehn's* work has provided insights into the molecular and physiological organization of neuronal circuits in the spinal cord that generates locomotor movements. **He discovered the identity of neuronal circuits in the spinal cord that control the ability to produce the alternating movements of the legs during locomotion** and neurons that set the tempo in the rhythmically active networks. Current work has a focus on descending locomotor command systems, and to functionally integrate brainstem and spinal locomotor networks with higher brain functions.

*Kiehn's* lab is also engaged in characterizing plasticity in spinal networks and motor neurons following lesions of the cord with an aim of devising targeted manipulation of these changes to alleviate dysfunctional motor symptoms following spinal cord injury.

Professor
**Ole Kiehn**

Sweden

IRP schellenberg research prize 2004

## PUBLICATIONS – MILESTONES


**2015, Cell**: Bouvier J, Caggiano V, Leiras R, Caldeira V, Bellardita C, Balueva K, Fuchs A, Kiehn O
*Descending command neurons in the brainstem that halt locomotion*.

**2013, Nature**: Talpalar AE, Bouvier J, Borgius L, Fortin G, Pierani A, Kiehn O
*Dual-mode operation of neuronal networks involved in left–right alternation*.

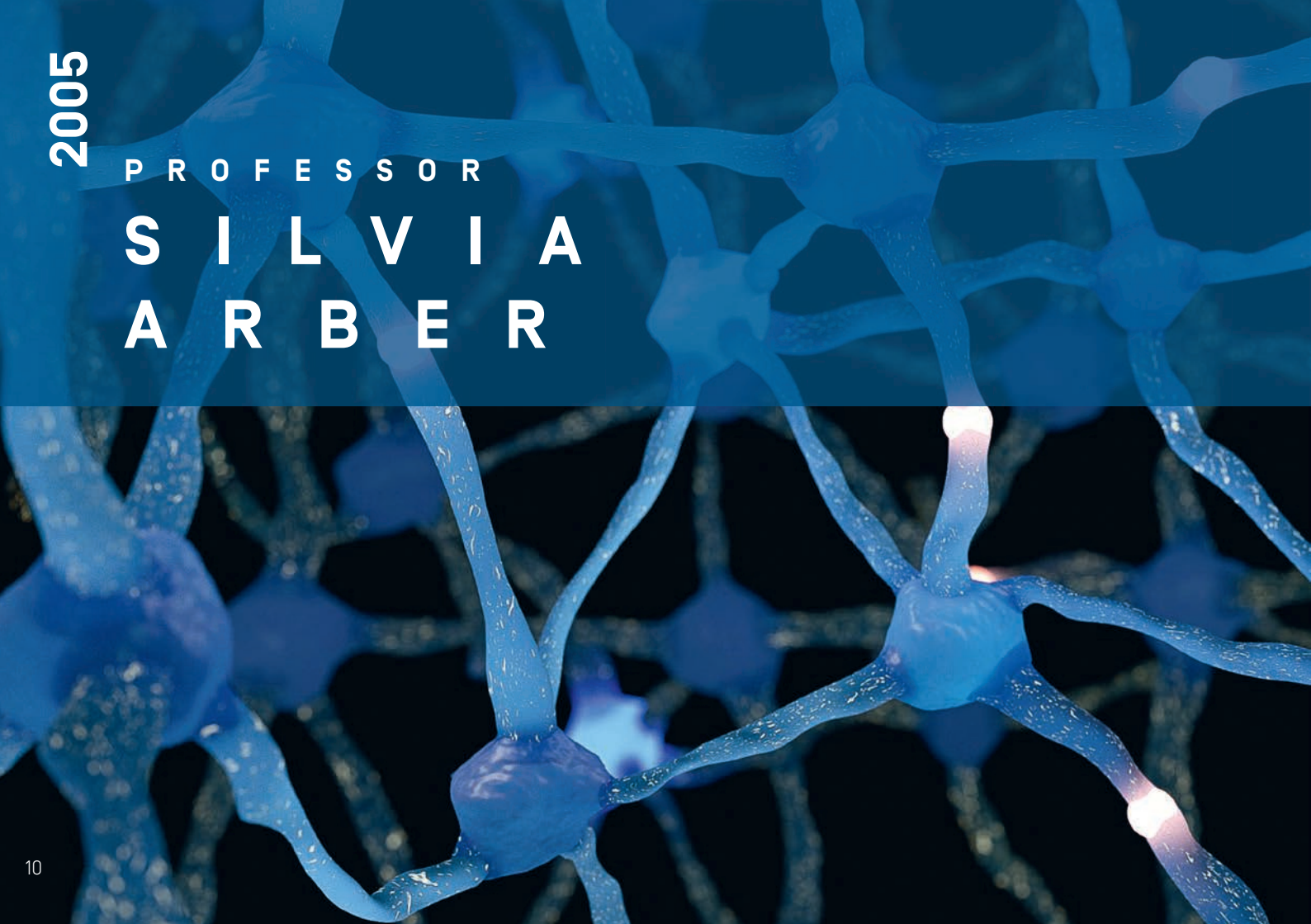
**2010, Nature Neuroscience**: Hägglund M, Borgius L, Dougherty KJ, Kiehn O
*Light activation of glutamatergic neurons in the mammalian brainstem or spinal cord evokes hind limb locomotion*.

**2003, Neuron**: Butt SJB, Kiehn O
*Functional identification of interneurons responsible for left-right coordination of hind limbs in mammals*.

2005

PROFESSOR

# SILVIA ARBER



**BIO EXPRESS**

**Currently** Professor of Neurobiology Biozentrum, University of Basel and Senior Group Leader Friedrich Miescher Institute, Basel

**2015** AAAS Membership

**2015** City of Basel Award

**2014** Otto Naegeli Prize for Medical Research

**2005** IRP Schellenberg Research Prize Winner

**2005** EMBO Membership

**2003** National Latsis Prize

**1996** Postdoctoral Fellow, Columbia University, New York

**1995** PhD in Neuroscience

## LAB DESCRIPTION

Research in the *Arber* lab focuses on understanding the organization and function of neuronal circuits involved in the control of motor behaviour, and on how injury impacts on and leads to reorganization of these neuronal circuits. **Using modern technologies, Arber's lab has recently unravelled the organization of the communication matrices between the brainstem and the spinal cord**. They found that highly specific modules exist for pathways from the brainstem to the spinal cord, as well as in the opposite direction.

*Arber's* work has for example identified a previously uncharacterized brainstem nucleus involved in the control of grasping through the control of spinal circuits. Furthermore, using a model of incomplete spinal cord injury, the *Arber* lab found that sensory feedback from muscle spindles is absolutely essential for functional recovery after injury and reorganization of descending neuronal circuits from the brainstem and within the spinal cord. Together, this work highlights the importance of identifying specific neuronal populations as entry point to understand motor function in health and upon injury.

Professor
**Silvia Arber**

Switzerland

IRP schellenberg research prize 2005

## PUBLICATIONS – MILESTONES


**2015**, **Cell**: Basaldella E, Takeoka A, Sigrist M, Arber S
*Multisensory signaling shapes vestibulo-motor circuits specificity.*

**2015, Neuron**: Goetz C, Pivetta C, Arber S
*Distinct limb and trunk premotor circuits establish laterality in the spinal cord.*

**2014, Cell**: Takeoka A, Vollenweider I, Courtine G, Arber S
*Muscle spindle feedback directs locomotor recovery and circuit reorganization after spinal cord injury.*

**2014, Nature**: Esposito MS, Capelli P, Arber S
*Brainstem nucleus MdV mediates skilled forelimb motor tasks.*

**2014, Cell**: Pivetta C, Esposito MS, Sigrist M, Arber S
*Motor-circuit communication matrix from spinal cord to brainstem neurons revealed by developmental origin.*

2005

PROFESSOR

# BRIGITTE SCHURCH

## BIO EXPRESS

**Since 2012**
Head Physician
Neuro-Urology, Lausanne
University Hospital,
Lausanne (CHUV)

**Since 2012**
Associate Professor,
Lausanne University

**Since 2004**
Honorary Professor,
Zürich University

**2010-2012**
«KontinenzZentrum»,
Klinik Hirslanden, Zürich

**2005** IRP Schellenberg
Research Prize Winner

**1986-2010**
Head of Neuro-
Urology, Paraplegic
Centre Balgrist, Zürich

**1987** PhD in Medicine

## LAB DESCRIPTION

*Brigitte Schurch* specialises in problems related to bladder control in conjunction with neurological illnesses. She has expert knowledge in the treatment of paraplegic patients. In the nineties, **she discovered that by treating patients locally with *Botulinumtoxin* (Botox), the nervousness of the neurogenic bladder could be reduced to the extent that the patient overcame incontinence**.

In her team at the Lausanne University Hospital (*CHUV*), Professor Schurch works alongside neurologists, physiologists, therapists and specialised care workers. Her range of treatment is comprehensive and encompasses neurological symptoms such as, cerebral haemorrhages, spinal cord injuries, and multiple sclerosis.

Her research work examines the supraspinal control of the bladder function, and the use of new substances in the treatment of functional disorders of the neurogenic bladder.
Professor Schurch is also actively involved in the *Neuroprosthetic* Project of Professor Grégoire Courtine, who is also a winner of the IRP Schellenberg Research Prize.

Professor
**Brigitte Schurch**

Switzerland

IRP schellenberg research prize
**2005**

## PUBLICATIONS – MILESTONES

**2015, Annals of Physical and Rehabilitation Medicine**: van den Brand R, Mignardot JB, von Zitzewitz J, Le Goff C, Fumeaux N, Wagner F, Capogrosso M, Martin Moraud E, Micera S, Schurch B, Curt A, Carda S, Bloch J, Courtine G
*Neuroprosthetic technologies to augment the impact of neurorehabilitation after spinal cord injury*.

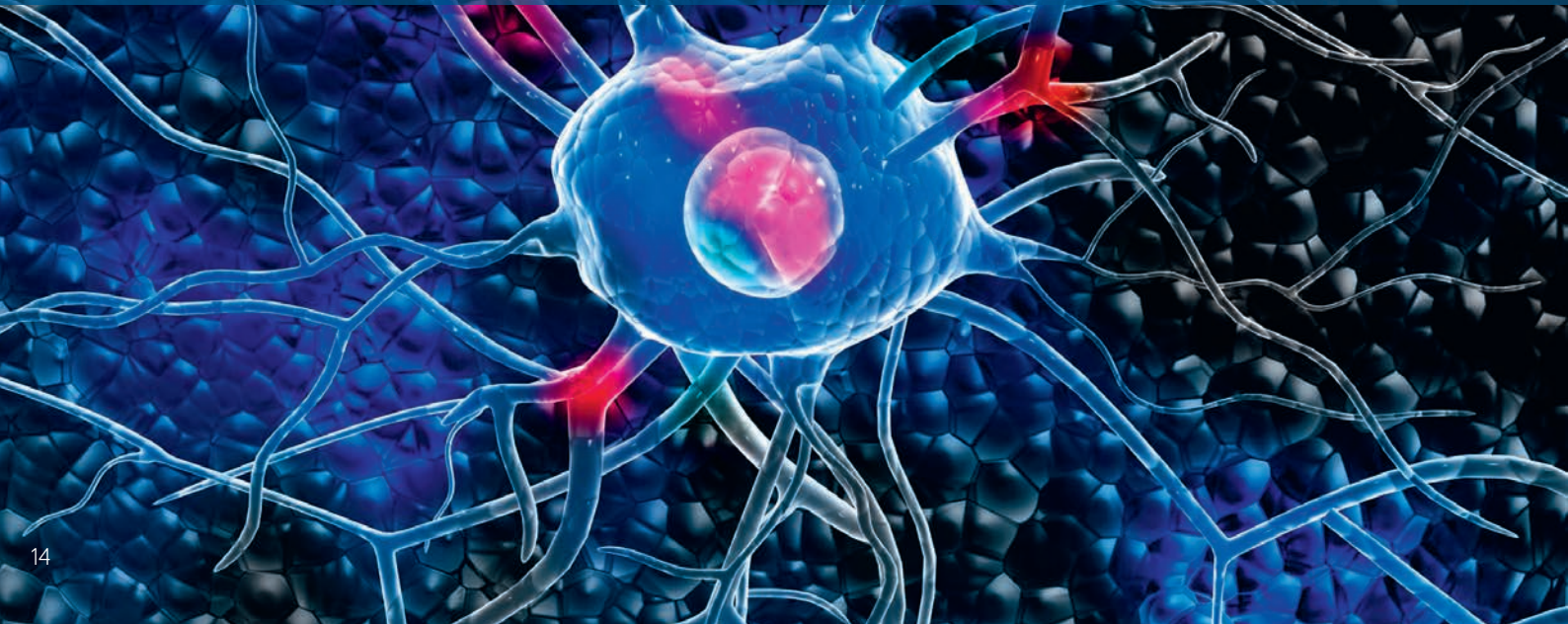
**2015, Cerebral Cortex (Oxford Journals)**: Michels L, Blok BF, Gregorini F, Kurz M, Schurch B, Kessler TM, Kollias S, Mehnert U
*Supraspinal Control of Urine Storage and Micturition in Men-An fMRI Study*.

**2010, NeuroImage**: Zempleni MZ, Michels L, Mehnert U, Schurch B, Kollias S
*Cortical substrate of bladder control in SCI and the effect of peripheral pudendal stimulation.*

2006

PROFESSOR

# LARS OLSON



## BIO EXPRESS

**Since 2010**
Senior Professor, Karolinska Institute (KI), Stockholm

**2006** IRP Schellenberg Research Prize Winner

**2000-2004**
Chair, Department of Neuroscience - KI

**1986-2009**
Professor of Neurobiology - KI

**1987-1993**
Chair, Department of Histology and Neurobiology - KI

**1970** PhD, Neuroscience - KI

## LAB DESCRIPTION

*Lars Olson's* Work has mainly concerned development, growth factors, regeneration, aging, transplantation in the central nervous system, models for *Parkinson's* disease and its treatment, models for spinal cord injury and treatment strategies, the roles of proteins that regulate gene activity in the brain, genetic risk factors for *Parkinson's* disease, and proteins that inhibit nerve growth in the nervous system.

Research has been taken all the way from animal studies to clinical trials.

**Current focus is aging, neurodegenerative diseases, spinal cord injury and the role of the *Nogo system* in brain plasticity focusing on the formation of lasting memories and memory disorders.**

Professor
**Lars Olson**

Sweden

IRP schellenberg research prize 2006

## PUBLICATIONS – MILESTONES

**2016, Cerebral Cortex**: Karlsson et al.
*A tunable sensor regulating formation, synaptic and dendritic plasticity*. How levels of NgR1, a receptor for the nerve growth inhibitory protein Nogo, regulates density of contacts between nerve fibers.

**2012, PloS One**: Abrams et al.
*Imatinib enhances functional outcome after spinal cord injury*. Cancer drug counteracts spinal cord injury.

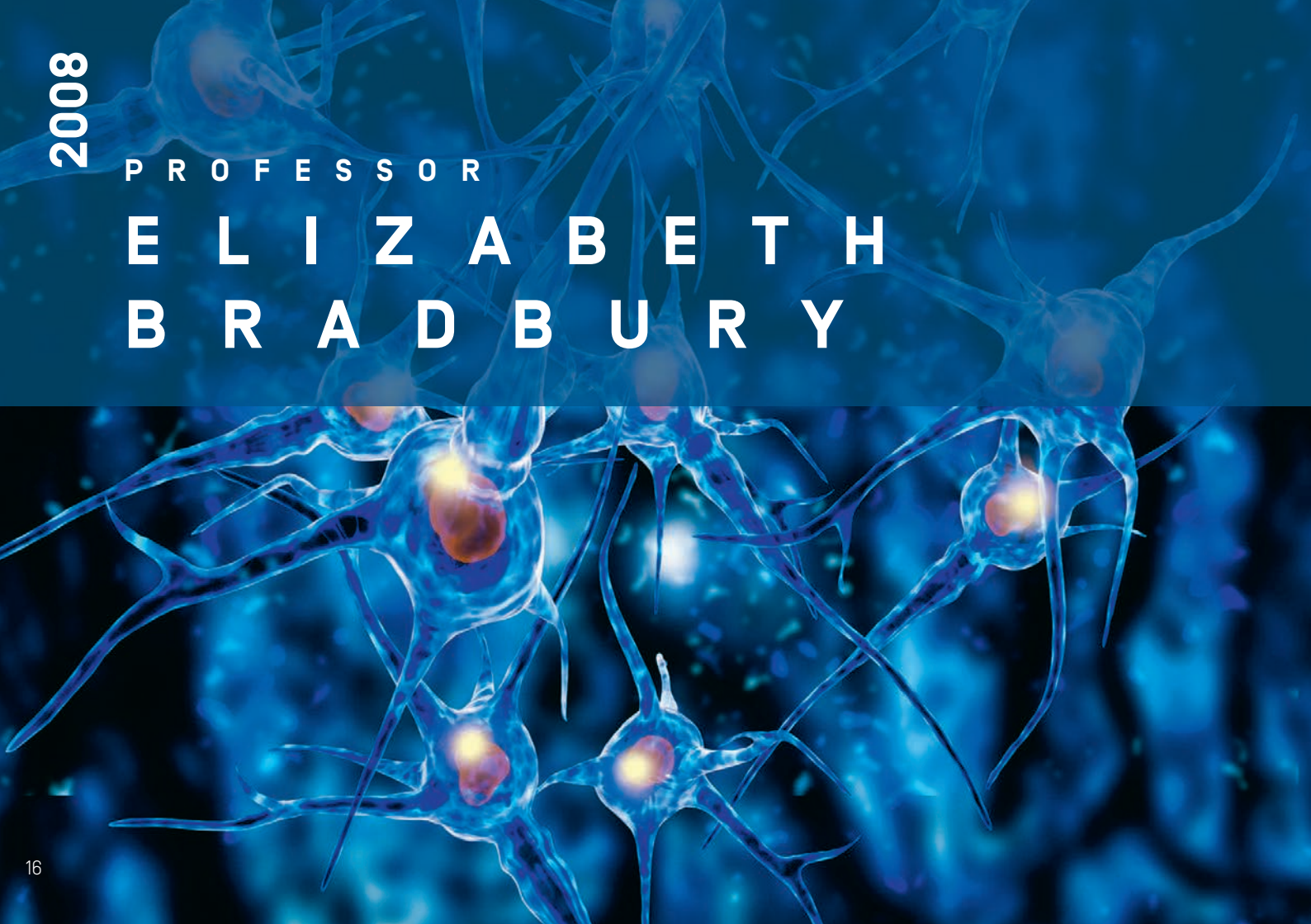
**2007, Brain**: Endo et al.
*Cortical sensory map rearrangement after spinal cord injury: fMRI responses linked to Nogo signalling*. Brain plasticity after spinal cord injury.

**2005, Nature Neuroscience**: Hofstetter et al.
*Allodynia limits the usefulness of intraspinal neural stem cell grafts; directed differentiation improves outcome*. Stem cell grafts in spinal cord injury.

2008

PROFESSOR

# ELIZABETH BRADBURY



BIO EXPRESS

**2015** Professor of Regenerative Medicine and Neuroplasticity

**2011** Medical Research Council (MRC) Senior Fellowship

**2008** IRP Schellenberg Research Prize Winner

**2003** MRC Career Development Award; Group Leader at King's College London

**1999-2001** Wellcome Trust Research Fellow, King's College London

**1996–1999** Post-Doctoral Fellow, St. Thomas Hospital, London

**1996** PhD in Neuroscience

## LAB DESCRIPTION

Research in the *Bradbury* Lab focuses on understanding why the injured spinal cord is unable to repair itself, with a particular interest in the injury scar which blocks nerve regeneration and prevents tissue repair.

***Bradbury's* work led to the discovery that treating the spinal cord with an enzyme called *chondroitinase* could enable nerve fibres to regenerate through scar tissue**, form new connections with target cells and restore some function to paralysed limbs in experimental models. This work has had a major impact and *chondroitinase* is now a leading candidate for translating to the clinic.

*Bradbury* is a member of the international CHASE-IT *Consortium* (*chondroitinase* for injury therapy) who are developing and testing a *chondroitinase* gene therapy which is safe for human use. Current research is focused on combining *chondroitinase* gene therapy (to encourage nerve fibre growth or «neuroplasticity») with a neurorehabilitation programme to improve hand function.

Professor
**Elizabeth Bradbury**

Great Britain

IRP schellenberg research prize 2008

## PUBLICATIONS – MILESTONES

**2015, Experimental Neurology**: James ND, Shea J, Schneider BL, Muir EM, Bradbury EJ
*Chondroitinase gene therapy improves upper limb function following cervical contusion injury*. The first demonstration that chondroitinase gene therapy can restore upper limb function after cervical contusion injury.

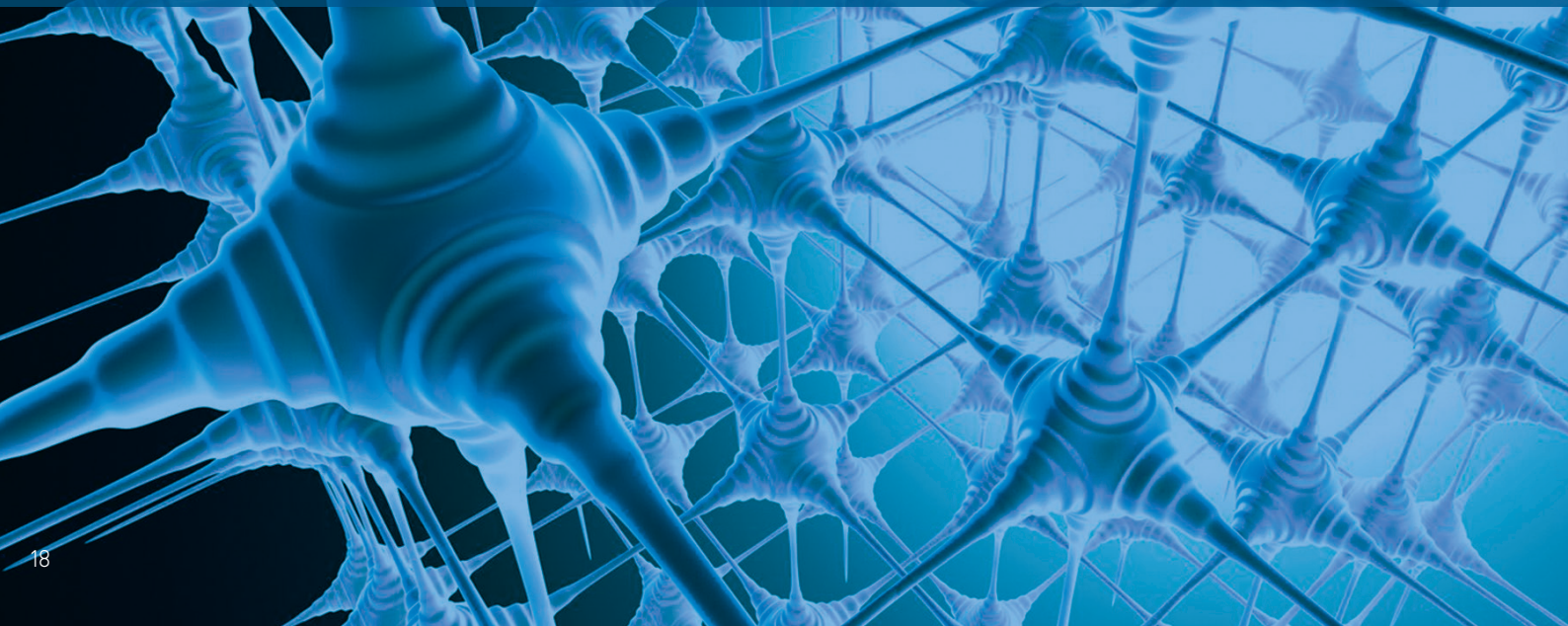
**2014, The Lancet Neurology**: Ramer LM, Ramer MS, Bradbury EJ
*Restoring function after spinal cord injury: towards clinical translation of experimental strategies*.

**2002, Nature**: Bradbury EJ, Moon LD, Popat RJ, King VR, Bennett GS, Patel PN, Fawcett JW, McMahon SB
*Chondroitinase ABC promotes functional recovery after spinal cord injury*. The first demonstration that chondroitinase treatment could restore function after spinal cord injury.

2010

PROFESSOR

# GRÉGOIRE COURTINE



## BIO EXPRESS

**2016** European Research Council (ERC) Consolidator grant awarded

**2014** Founder, G-Therapeutics SA, Lausanne / Eindhoven

**2013** Debiopharm Prize

**2012** Associate Professor at IRP Chair in Spinal Cord Repair EPFL

**2010** IRP Schellenberg Research Prize Winner

**2008** University of Zurich

**2005-2007** Christopher Reeve Foundation

**2004-2007** University of California, Los Angeles

**2003** PhD in experimental medicine

## LAB DESCRIPTION

Over the past 15 years, Prof Courtine and his team have developed an unconventional therapeutic strategy that **re-established voluntary control of leg movements in rats with a spinal cord injury leading to complete and permanent paralysis**. This strategy is shortly described as follows: when an injury occurs, the brain signals to the spinal cord are severely compromised.

The neurons that control the muscles become dormant. To reawaken these neurons, a combination of chemical and electrical stimulation is delivered to the spinal cord. During training, the rats are placed in a cutting-edge robotic interface that supports their weight against gravity in a safe environment. This robot encourages the rat to volontarily move itself toward a food reward. This intervention promotes the growth of neuronal connections. Even after a severe injury, the rats regain the ability to walk.

Professor Courtine has implemented a research program and founded a start-up to develop all the technologies necessary to apply these therapeutic concepts in paraplegic people.

Professor
**Grégoire Courtine**

France

IRP schellenberg research prize 2010

## PUBLICATIONS – MILESTONES

**2016, Neuron**: Martin Moraud E. et al.
**2016, Nature Medicine**: Wenger N. et al.
**2015, Science Translational Medicine**: Friedli L. et al.
**2015, Science**: Minev. I et al.
**2014, Cell**: Takeoka A. et al.
**2014, Neuron**: Borton DA. et al.
**2014, Science Translational Medicine**: Wenger N. et al.
**2014, Neuron**: Borton DA. et al.
**2013, Science Translational Medicine**: Borton DA. et al.
**2012, Nature Medicine**: Dominici N. et al.
**2012, Science**: Van den Brand R. et al.
**2010, Nature Neuroscience**: Courtine G. et al.
**2009, Nature Neuroscience**: Courtine G. et al.
**2008, Nature Medicine**: Courtine G. et al.
**2007, Nature Medicine**: Courtine G. et al.

2010

PROFESSOR

# OLIVIER RAINETEAU

## BIO EXPRESS

**2014** Research Director at INSERM, Paris

**2013-2016** Recipient of an IDEX package – official French «Initiative of Excellence»

**2010-2015** Recipient of a Swiss National Research Program grant

**2010** IRP Schellenberg Research Prize Winner

**2009-2014** Group Leader, Swiss Federal Institute of Technology Zurich (ETHZ)

**2004-2008** Group leader, University of Cambridge, UK

**2001** PhD in Neurosciences

## LAB DESCRIPTION

Research in the *Raineteau* Lab aims at understanding the capacities of the injured CNS (central nervous system) tissue to undergo plasticity and regeneration after a lesion.
He has participated to research demonstrating that significant spontaneous recovery occurs after spinal cord injury. **His work showed that this spontaneous but incomplete reorganization could be potentiated by neutralization of the neurite growth inhibitor *Nogo-A***. He also explored the mechanisms by which digestion of the extracellular matrix by *chondroitinase* promotes functional reorganisation of CNS circuits.

His most recent research aims at better understanding the capacities of neural stem cells (NSCs) to participate to CNS repair.

His group currently studies the plastic potential of postnatal CNS stem cells, that is to say their capacity to change fate upon manipulation of intrinsic or extrinsic factors. By unravelling how environmental signals and transcriptional networks determine NSCs behaviours, his research brings key knowledge to design innovative approaches for their recruitment after lesion or in pathologies.

Professor
**Olivier Raineteau**

France

IRP schellenberg research prize 2010

## PUBLICATIONS – MILESTONES


**2015, Stem Cells**: Azim K, Hurtado-Chong A, Fischer B, Kumar N, Zweifel S, Taylor V, Raineteau O
*Transcriptional Hallmarks of Heterogeneous Neural Stem Cell Niches of the Subventricular Zone*.

**2012, Nature Neuroscience**: Orlando C, Ster J, Gerber U, Fawcett J & Raineteau O
*Peri-synaptic chondroitin sulfate proteoglycans restrict structural plasticity in an integrin-dependent manner*.

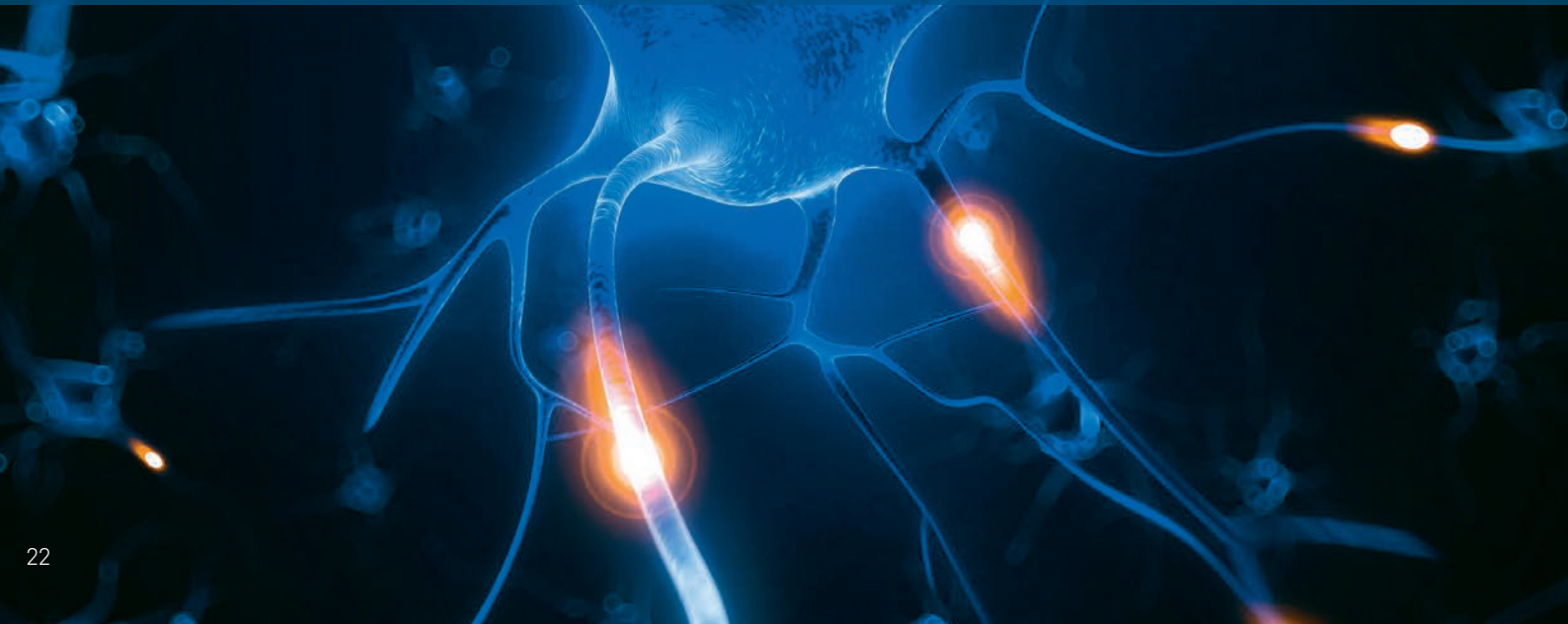
**2009, Nature Neuroscience**: Brill MS, Ninkovic J, Winpenny E, Hodge RD, Ozen I, Yang R, Lepier A, Gascón S, Erdelyi F, Szabo G, Parras C, Guillemot F, Frotscher M, Berninger B, Hevner RF, Raineteau O, Götz M
*Adult generation of glutamatergic olfactory bulb interneurons.*

**2004, Nature Neuroscience**: Bareyre FM, Kerschensteiner M, Raineteau O, Mettenleiter TC, Weinmann O, Schwab ME.
*The injured spinal cord spontaneously forms a new intraspinal circuit in adult rats*.

2011

PROFESSOR

# MICHAEL FAINZILBER



## BIO EXPRESS

**2013-2018** European Research Council (ERC) Advanced Research Grant

**2011** IRP Schellenberg Research Prize Winner

**Since 2006** Chaya Professorial Chair in Molecular Neuroscience, Weizmann Institute

**1998-2005** Koshland Career Development Chair, Weizmann Institute

**1995-1997** Postdoctoral Fellow, Karolinska Institute

**1993-1995** Postdoctoral Fellow, Vrije Universiteit Amsterdam

**1993** PhD in Life Sciences

## LAB DESCRIPTION

Research in the *Fainzilber* Lab is focused on understanding basic mechanisms of intracellular communication along nerve axons, in particular how the axons communicate information about an injury to the neuronal soma.

*Fainzilber* and colleagues **identified a central role for nuclear import factors called *importins* in injury signalling from axon to soma**, and showed that localized translation of an *importin* mRNA in axons is required to trigger this process.

The *Fainzilber* lab is currently trying to identify small molecule agonists of these mechanisms as potential drug leads for the acceleration of nerve regeneration.

Professor
**Michael (Mike) Fainzilber**
Israël

IRP schellenberg research prize 2011

## PUBLICATIONS – MILESTONES

**2012, Neuron**: Perry RB, Doron-Mandel, E, Iavnilovitch E, Rishal I, Dagan SY, Tsoory M, Coppola G, McDonald MK, Gomes C, Geschwind DH, Twiss JL, Yaron A, Fainzilber M *Subcellular knockout of importin beta1 perturbs axonal retrograde signaling. Definitive proof of the role of local translation in axons in triggering retrograde injury signalling.*

**2010, Science Signaling**: Michaelevski I, Segal-Ruder Y, Rozenbaum M, Medzihradszky KF, Shalem O, Coppola G, Horn-Saban S, Ben-Yaakov K, Dagan S, Rishal I, Geschwind DH, Pilpel Y, Burlingame AL, Fainzilber, M *Signaling to transcription networks in the neuronal retrograde injury response. Identification of importin-dependent "master regulators" of the injury response.*

**2003, Neuron**: Hanz S, Perlson E, Willis D, Zheng JQ, Massarwa R, Huerta JJ, Koltzenburg M, Kohler M, van-Minnen J, Twiss JL, Fainzilber M *Axoplasmic importins enable retrograde injury signaling in lesioned nerve.*

2011

PROFESSOR

# FRANK BRADKE

BIO EXPRESS

**2016** Gottfried Wilhelm Leibniz-Prize

**2014** Member Leopoldina

**2013** Member EMBO

**2011** IRP Schellenberg Research Prize Winner

**2011** Professor at the University of Bonn and Senior Research Group Leader for Axonal Growth and Regeneration at DZNE

**2003-2011** Max Planck Institute of Neurobiology

**2000-2002** Postdoc in the U.S.

**1999** PhD

**1995** Diploma in Biochemistry

**1994** B.Sc., University College London

## LAB DESCRIPTION

Research in the *Bradke* lab focuses on how nerve cells grow during development and how these processes can be reactivated to induce nerve regeneration in the injured spinal cord. His laboratory has a special interest in the skeleton of the cell, called the *cytoskeleton*.

*Bradke* and his coworkers **showed that manipulation of the cytoskeleton with low doses of anticancer drugs leads to regrowth of nerves and reduction of scarring**.

His lab also developed a novel imaging technique that enables visualization of nerves at microscopic resolution within whole tissue.

Professor
**Frank Bradke**

Germany

IRP schellenberg research prize 2011

## PUBLICATIONS – MILESTONES


**2015, Science**: Ruschel J, Hellal F, Flynn KC, Dupraz S, Elliott DA, Tedeschi A, Bates M, Sliwinski C, Brook G, Dobrindt K, Peitz M, Brüstle O, Norenberg MD, Blesch A, Weidner N, Bunge MB, Bixby JL, Bradke F
*Axonal regeneration. Systemic administration of epothilone B promotes axon regeneration after spinal cord injury*.

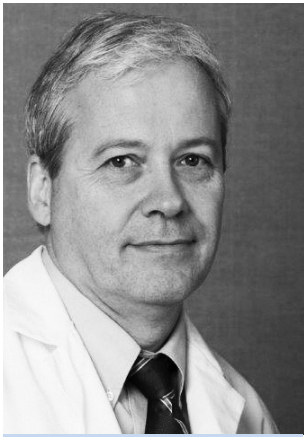
**2012, Neuron**: Flynn KC, Hellal F, Neukirchen D, Jacobs S, Tahirovic S, Dupraz S, Stern S, Garvalov BK, Gurniak C, Shaw A, Meyn L, Wedlich-Söldner R, Bamburg JR, Small JV, Witke W, Bradke F
*ADF/cofilinmediated Actin Retrograde Flow Directs Neurite Formation in the Developing Brain*.

**2011, Nature Medicine**: Ertürk A, Mauch CP, Hellal F, Förstner F, Keck T, Becker K, Jährling N, Steffens H, Richter M, Hübener M, Kramer E, Kirchhoff F, Dodt HU, Bradke F
*3D imaging of the unsectioned adult spinal cord to assess axon regeneration and glial responses after injury*.

2012

PROFESSOR

# ARMIN CURT



## BIO EXPRESS

**2012** IRP Schellenberg Research Prize Winner

**Since 2009** Full Professor for Paraplegiology and Medical Director, Balgrist University Hospital, Zurich

**2005-2008** Associate Professor in Neurology and SCI Research, University of British Columbia, CA

**2005** Fellow Royal College of Physicians and Surgeons of Canada

**2005** Associate Professor for Neurorehabilitation, University of Zurich

**1998** Licensed Specialist in Neurology and Clinial Neurophysiology

## LAB DESCRIPTION

The research laboratory of the *Spinal Cord Injury Center* at the *Balgrist University Hospital*, University of Zurch, is devoted to research in humans suffering from paraplegia.

The clinical center is focused on translational research from bench (basic science) to bed (i.e. true clinical applications) and is spearheading novel approaches for clinical trial design and treatments in acute and chronic human spinal cord injury (SCI). It is chairing the *European Multicenter Study in SCI* (www.EMSCI.org) that is prospectively collecting the most comprehensive and standardized data sets about the recovery from SCI based on generous and visionary funding by IRP since 2001.

**The *SCI Center Balgrist* has been centrally involved in designing and performing interventional clinical trials in acute SCI** (phase I study with first in man intrathecal application of antibodies against *Nogo-A*; phase II study of *Nogo-A antibodies* in incomplete SCI (NISCI); first international study for the transplantation of human neural stemcells into the cord of patients with SCI).

Professor
**Armin Curt**

Switzerland

IRP schellenberg research prize 2012

## PUBLICATIONS – MILESTONES

**2015, Annals of Neurology**: Grabher P, Curt A
*Tracking sensory system atrophy and outcome prediction in spinal cord injury*.

**2014, The Lancet Neurology**: Klamroth-Marganska V, Curt A
*Three-dimensional, task-specific robot therapy of the arm: a multicenter randomized clinical trial in stroke patients*.

**2013, Neurology**: Ulrich A, Curt A
*Improved diagnosis of in spinal cord disorders with heat evoked potentials*.

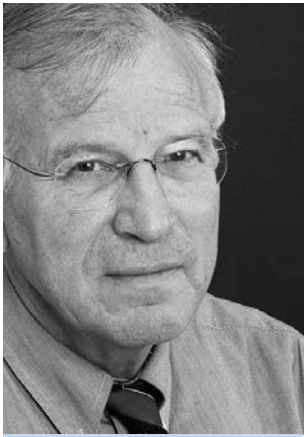
**2012, Spinal Cord**: Curt A
*The translational dialogue in spinal cord injury research*.

**2011, The Lancet**: van Middendorp JJ, Curt A
*A clinical prediction rule for ambulation outcomes after traumatic spinal cord injury: a longitudinal cohort study*.

2012

PROFESSOR

# VOLKER DIETZ



## BIO EXPRESS

**Since 2009**
Senior Research Professor University Hospital Balgrist

**2012** IRP Schellenberg Research Prize Winner

**1992-2009**
Head of the Paraplegic Centre and the Chair of Paraplegiology at the University of Zurich

**2007** Hans Berger prize

**2006** Sobek prize

**2002-2003**
Visiting Professor, University of Miami

**2001** Fellow of the Royal College of Physicians

**1983** Professor of Neurology, University of Freiburg

## LAB DESCRIPTION

**Translational research - «from bench to bed»**

- Creation and development of the *European Multicenter Spinal Cord Injury* (EM-SCI), a network of paraplegic centres acting as a data base for research projects.
- Together with Novartis and Prof. M Schwab, completion of the phase I trial for using *Nogo-A-antibodies* to regenerate human spinal cord.

**Technology and neurorehabilitation**

- In association with the Swiss Federal Institute of Technology (ETH), development of the first walking robot *Lokomat*, to aid gait training and the ability to walk.
- Publication of the textbooks *Neurorehabilitation Technology* (Springer, 2012) and *Neurorehabilitation*, textbook series *Neurology* (Oxford University Press, 2015).

**Main research projects**

- Neuroplasticity in the case of paraplegia and stroke: What makes a functional training effective?
- Evidence of the development of a neuronal dysfunction in the event of severe paralysis.
- Alteration in the function of the reflexes following paraplegia or stroke.
- Initial description of a *neuronal coupling* between cooperative hand movements and their dysfunction following stroke.

Professor
**Volker Dietz**

Switzerland

IRP schellenberg research prize 2012

## PUBLICATIONS – MILESTONES


**2015, Oxford Journals, Cerebral Cortex**: Dietz V, Macauda G, Schrafl-Altermatt M, Wirz M, Kloter E, Michels L
*Neural coupling of cooperative hand movements: A reflex and fMRI study*.

**2014, Oxford Journals, Brain**: Dietz V, Fouad K
*Restoration of sensori-motor functions after spinal cord injury*.

**2011, Oxford Journals, Brain**: Kloter E, Wirz M, Dietz V
*Locomotion in stroke subjects: Interactions between unaffected and affected sides*.

**2010, Nature Reviews Neurology**: Dietz V
*Behavior of spinal neurons deprived of supraspinal input*.

**2009, Oxford Journals, Brain**: Dietz V, Grillner S, Trepp A, Hubli M, Bolliger M
*Changes in spinal reflex and locomotor activity after a complete spinal cord injury: A common mechanism?*

2013

PROFESSOR

# TOMMASO PIZZORUSSO

BIO EXPRESS

**Currently** Associate Professor, University of Florence (since 2005); associate scientist, Institute of Neuroscience CNR, Pisa

**2013** IRP Schellenberg Research Prize Winner

**1998** Lecturer, Scuola Normale Superiore(SNS), Pisa University System

**1995-1998** Postdoc, Institute of Neurophysiology CNR, Pisa

**1994** Postdoc, Georgetown University, USA

**1993** PhD in Neurobiology

## LAB DESCRIPTION

*Pizzorusso's* long-term interest is to understand the functional basis of formation and response to pathology of cortical circuits in normal conditions. To answer this question, models of environmental (visual deprivation), genetic (models of neurodevelopmental disorders), and vascular lesions are used. The approach is to combine electrophysiological and imaging techniques with molecular studies. **The lab has a longstanding expertise in such experiments on visual system function and plasticity in mice**.

Current main research topics are

- Role of epigenetic mechanisms in experience-dependent development of the visual cortex.
- Role of perineuronal nets in controlling critical periods of brain development.
- Plasticity mechanisms after stroke in juvenile and adult animals.
- Circuit development defects in Rett *syndrome*, an incurable developmental condition that mostly affects young girls.

Professor
**Tommaso Pizzorusso**
Italy

IRP schellenberg research prize 2013

## PUBLICATIONS – MILESTONES

**2015, Biological Psychiatry**: Della Sala G, Putignano E, Chelini G, Melani R, Calcagno E, Michele Ratto G, Amendola E, Gross CT, Giustetto M, Pizzorusso T *Dendritic Spine Instability in a Mouse Model of CDKL5 Disorder Is Rescued by Insulin-like Growth Factor 1.*

**2015, Cerebral cortex**: Gherardini L, Gennaro M, Pizzorusso T *Perilesional Treatment with Chondroitinase ABC and Motor Training Promote Functional Recovery After Stroke in Rats*.

**2015, Nature Neuroscience**: Tognini P, Napoli D, Tola J, Silingardi D, Della Ragione F, D'Esposito M, Pizzorusso T *Experience-dependent DNA methylation regulates plasticity in the developing visual cortex.*

**2013, Nature Communications**: de Vivo L, Landi S, Panniello M, Baroncelli L, Chierzi S, Mariotti L, Spolidoro M, Pizzorusso T, Maffei L, Ratto GM *Extracellular matrix inhibits structural and functional plasticity of dendritic spines in the adult visual cortex.*

2013

PROFESSOR

# JOOST VERHAAGEN

## BIO EXPRESS

**Since 1998**
Professor, Vrije Universiteit, Amsterdam

**2013** IRP Schellenberg Research Prize Winner

**2004** Raine (Foundation) Visiting Professor, UWA, Perth

**1994-1999**
Pioneer Fellow, NL Institute for Neuroscience, Amsterdam

**1992** Visiting Scientist, Rockefeller University, USA

**1990–1994**
Research Fellow, Royal Academy of Science, RMI, Utrecht

**1987-1989**
Post-doctoral Fellow, Roche Institute for Molecular Biology, NJ, USA

## LAB DESCRIPTION

The *Verhaagen* lab focusses on understanding the molecular and cellular processes that drive regeneration in the peripheral nervous system and that underline the failure of regeneration in the central nervous system, with a focus on the role of regeneration-associated transcription factors and chemorepulsive proteins.

*Verhaagen's* work led to the discovery that the expression of the chemorepulsive guidance protein *Semaphorin3A* is induced in the neural scar. **He recently showed that *Semaphorin3A* is present in perineuroral nets, specialized extracellular matrix structures around mature neurons with a key role in regulating neuroplasticity**. His laboratory was among the first to use viral vector-mediated gene transfer as a strategy to express pro-regenerative proteins in the injured nervous system and he is currently involved in generating novel regulatable gene therapy vectors based on "Stealth" technology.

*Verhaagen* is a member of the *CHASE-IT* consortium, which is developing gene therapy for *chondroitinase*, an enzyme which enables axon regeneration through scar tissue, most likely by releasing inhibitory molecules, like *Semaphorin3A*, from the matrix.

Professor
**Joost Verhaagen**

Netherlands

IRP schellenberg research prize 2013

## PUBLICATIONS – MILESTONES


**2015, Human Molecular Genetics**: Fagoe FD, Attwell CL, Kouwenhoven D, Verhaagen J., Mason MR
*Overexpression of ATF3 or a combination of ATF3, c-Jun, STAT3 and Smad1 promotes regeneration of the central axon branch of sensory neurons but without synergistic effects.*

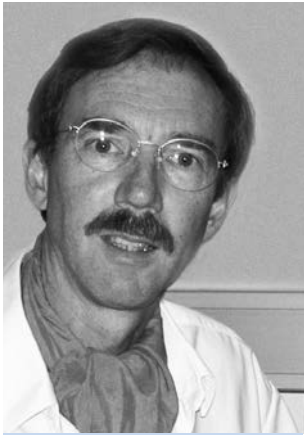
**2014, Gene Therapy**: Hoyng SA, Gnavi S, De Winter F, Eggers R, Ozawa T, Zaldumbide A, Hoeben RC, Malessy MJ and Verhaagen J
*Developing a potentially immunologically inert tetracycline-regulatable viral vector for gene therapy in the peripheral nerve.*

**2013, Molecular and Cellular Neuroscience**: Vo T, Carulli D, Ehlert EM, Kwok JC, Dick G, Mecollari V, Moloney EB, Neufeld G, De Winter F, Fawcett JW and Verhaagen J
*The chemorepulsive axon guidance protein semaphorin 3A is a constituent of perineuronal nets in the adult rodent brain.*

2016

PROFESSOR

# MARTIN E. SCHWAB



BIO EXPRESS

**2016** IRP Schellenberg Research Prize Winner

**Since 1997** Professor of Neuroscience, ETH Zurich

**Since 1985** Professor of Brain Research, University of Zurich

**1979-1985** Group leader, Max-Planck Institute for Psychiatry, Munich

**1978-1979** Research Fellow, Dept. Neurobiology, Harvard Medical School

**1978** Lecturer, University of Basel

**1974-1978** Postdoc, Biocenter Basel

**1973** PhD in Zoology

## LAB DESCRIPTION

With his group in Zurich *Martin Schwab* discovered the existence of potent nerve fiber growth inhibitory factors which are present in the adult brain and spinal cord. This new concept was rapidly adopted by the neuroscience community and became the basis of many studies on regeneration and repair after spinal cord and brain injuries in many laboratories worldwide.

An important further breakthrough was the demonstration that antibody-mediated neutralization of one of the most potent neurite growth inhibitory factors, *Nogo-A*, lead to long distance regeneration of injured nerve fibers in the rat spinal cord and to greatly improved functional recovery. **These results overthrew the dogma that the adult mammalian spinal cord and brain would be unable to regenerate**. Intense rehabilitation training was shown to further enhance the structural and functional repair processes.

Today, *anti-Nogo-A* immunotherapy is in clinical trials and is widely seen as one of the most advanced and promising new therapeutic approaches to improve patients' lives for spinal cord injury, brain injury, stroke and also multiple sclerosis.

Professor
**Martin E. Schwab**

Switzerland

IRP schellenberg research prize 2016

## PUBLICATIONS – MILESTONES


**2014, Science**: Wahl AS, Omlor W, Rubio JC, Chen JL, Zheng H, Schröter A, Gullo M, Weinmann O, Kobayashi K, Helmchen F, Ommer B, Schwab ME
*Neuronal repair. Asynchronous therapy restores motor control by rewiring of the rat corticospinal tract after stroke*.

**2006, Nature Medicine**: Freund P, Schmidlin E, Wannier T, Bloch J, Mir A, Schwab ME and Rouiller E
*Nogo-A-specific antibody treatment enhances sprouting and functional recovery after cervical lesion in adult primates*.

**2000, Nature**: Chen MS, Huber AB, van der Haar ME, Frank M, Schnell L, Spillmann AA, Christ F and Schwab ME
*Nogo-A is a myelin-associated neurite outgrowth inhibitor and an antigen form monoclonal antibody IN-1*.

**1990, Nature**: Schnell L and Schwab ME
*Axonal regeneration in the rat spinal cord produced by an antibody against myelin-associated neurite growth inhibitors*.

# IMPRESSUM

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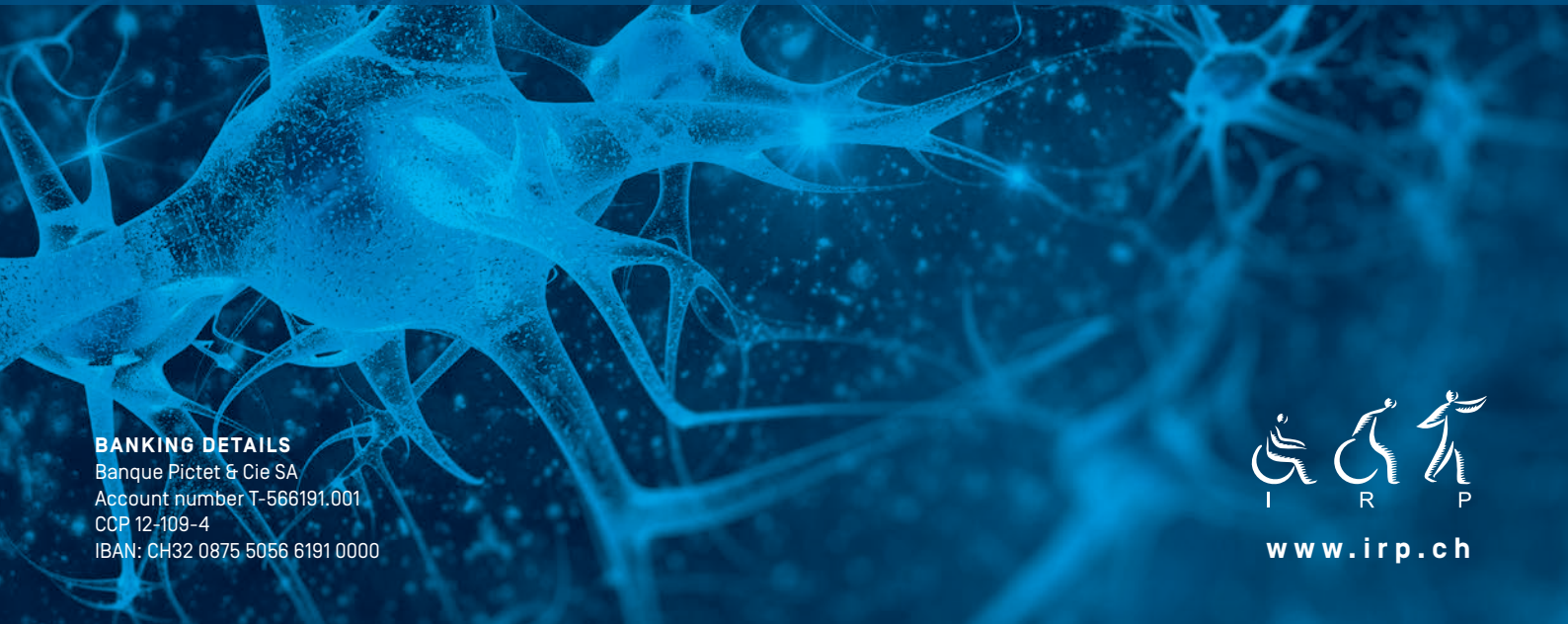

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