

# GREGOIRE COURTINE

## 1. PERSONAL INFORMATION

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I was trained in Physics and Neurosciences. My passion for translational neurosciences has fueled my research in the development of neurotechnologies to improve recovery from neurological disorders. After obtaining the Chancellor Award for post-doc studies at the University of California Los Angeles (UCLA), I established my own laboratory at the University of Zurich in 2008, before joining the Swiss Federal Institute of Technology Lausanne (EPFL) in 2012. I am now Full Professor of Neuroscience and Neurotechnology in the Neuro-X Institute at EPFL, and in the department of Neurosurgery at the University Hospital Lausanne (CHUV) where I am director of the Defitech Center for Interventional Neurotherapies (.NeuroRestore). I also cofound ONWARD medical, a scale-up now listed on EURONEXT that aims to translate the neurotechnologies developed in my laboratory into clinical treatments.

## 2. EDUCATION

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2001 - 2003 PhD (Neurosciences)  
INSERM Motricity and Plasticity, University of Bourgogne, France.  
Mentor: Dr T. Pozzo. Faculty of Medicine, University of Pavia, Italy.  
Mentor: Dr M. Schieppati

## 3. EMPLOYMENT HISTORY INCLUDING CURRENT POSITIONS

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2020 - present Director, Defitech center for interventional neurotherapies (.NeuroRestore), CHUV/EPFL/UNIL Lausanne, Switzerland

2019 - present Full Professor, Faculty of Life Science, EPFL, Switzerland

2019 - present Professor, Faculty of Biology and Medicine, University of Lausanne, Switzerland

2014 - present Consulting Chief Scientific Officer, ONWARD, Switzerland/Eindhoven

2013 - present Department of Neurosurgery, University hospital of Vaud (CHUV), Lausanne, Switzerland

2012 - 2019 Associate Professor, Faculty of Life Science, EPFL, Switzerland

2008 - 2012 Assistant Professor, Faculty of Medicine, University of Zurich, Switzerland

2005 - 2007 Associate Researcher, Christopher and Dana Reeve foundation

2004 - 2007 Postdoctoral Fellow, University of California, Los Angeles (UCLA), USA  
Mentors: Dr. V.R. Edgerton and Dr. M.V. Sofroniew

2001 - 2004 Doctoral Research Assistant, INSERM Motricity and Plasticity, University of Bourgogne, France. Faculty of Medicine, University of Pavia, Italy

## 4. PRIZES, FELLOWSHIPS, DISTINGUISHED MEMBERSHIPS

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2024 → Grand prix de l'Express

2023 → HEALTH-i Award, Hamburg, Germany

2023 → Penfield Lecture, Banff, Canada

2022 → Brain Computer Interface (BCI) Award (1<sup>st</sup> place)

2022 → BioAlps Academia Award 2022

2022 → Roger de Spoelberch Prize, Fondation Roger De Spoelberch

2021 → Prix Charpak-Dubousset, French Academy of Medicine

2021 → Presidential Lecture, *Society for Neuroscience*

2021 → Leenaards Scientific Prize

- 2021 → Robert Bing Prize
- 2020 → Harvey Prize, IET
- 2019 → Rolex Awards for Enterprise
- 2018 → Man of the Year 2018, Canton of Vaud, Switzerland
- 2018 → Goerg and Susanne Klein-Vogelbach Stiftung Award
- 2017 → MIT Technology Review, top ten Breakthrough Technologies
- 2016 → *Consolidator Grant, European Research Council (ERC)*
- 2014 → *Proof of concept Grant, European Research Council (ERC)*
- 2014 → Hello Tomorrow Challenge (1<sup>st</sup> place), European Startup contest
- 2013 → Debiopharm Prize
- 2009 → *Starting Grant, European Research Council (ERC)*
- 2009 → Schellenberg Prize from International Foundation for Research in Paraplegia
- 2008 → Chancellor's Award for Excellence in Post-doctoral Research, UCLA

## **5. CURRENT SUPERVISION OF RESEARCHERS**

**8 Postdoctoral Scientists EPFL:** Ceto, Steven; Collomb-Clerc Antoine; Dumont, Grégory; Lorach, Henri; Squair, Jordan; Sun, Shiqi; Yang, Xingchen, Phillipidès Antoine

**9 Postdoctoral Scientists CHUV:** Anderson, Mark ; Asboth, Léonie; Demesmaeker, Robin; James, Nicholas; Kathe, Claudia; Latchoumane, Charles; Milekovic, Tomislav; Rambousek, Lukas; Galvez, Andrea

**14 PhD Students EPFL:** Abranches, Pedro; Collin, Thibault; Dewany, Inssia;; Gandhi, Aasta; Gautier, Matthieu; Hernandez, Sergio; Macellari, Nicolo; Mahé, Loïs; Perez Puchalt Victor; Sakr, Icare; Soriano, Elaine; Teo, Yue Yang; Wang, Ruijia; Nguyen Vi Ahn

**6 PhD Students CHUV:** Amir, Suje; de Coucy, Alexandra; Hudelle, Remi; Laskaratos Achilleas; Regazzi, Nicola; Scafa, Stefano

## **6. TEACHING ACTIVITIES**

- 2012 Professor, Locomotion, EPFL, Lausanne (CH)
- 2014 Professor, Spinal cord physiology, EPFL, Lausanne (CH)
- 2014 Professor, Spinal cord injury, University of Lausanne, Lausanne (CH)
- 2014 Professor, Scientific Literature Analysis, EPFL, Lausanne (CH)
- 2015 Professor, Neuroprosthetics, EPFL, Lausanne (CH)
- 2023 Professor, Master NeuroX, EPFL, Lausanne (CH)

## **7. ORGANIZATION OF CONFERENCES**

- 2017 International Spinal Research Trust (ISRT), London, UK
- 2018 International Spinal Research Trust (ISRT), London, UK
- 2019 Gordon Conference on advances in Spinal cord injury, USA
- 2022 Beyond Isolated System, USA
- 2022-2028 Society for Neuroscience, Co-Chair Theme E: Motor Systems

## **8. INSTITUTIONAL RESPONSIBILITIES**

- 2016 Advisory board Preclinical neuroscience platform in Campus Biotech
- 2016 Advisory board Translational neuroscience platform in Fribourg
- 2022 Co-Chair Theme E: Motor Systems of the Scientific Organization Committee of the Society for Neuroscience (SfN)
- 2017 Advisory board Advanced Lightsheet Imaging Center (ALICE)
- 2012- Member of the Doctoral School Admission Committee (EDNE and EDEE)
- 2016- Member of the EPFL Campus Biotech Committee

## **9. MEMBERSHIPS IN PANELS, BOARDS AND SCIENTIFIC REVIEWING ACTIVITIES**

- 2015 Scientific Advisory board, Science Translational Medicine
- 2014 Evaluator, European Commission, Research Executive Agency (REA)
- 2013 Editorial board member, Journal of Neural Engineering
- 2012 Journal reviewer (selection): Science, Nature, Lancet, Nature Medicine, Science Translational Medicine, Nature Neurology, Journal of Neuroscience

2009 Member, Swiss Society for Neuroscience  
2003 Member, American Society for Neuroscience

## **10. MOST RELEVANT PEER-REVIEWED PUBLICATIONS AS SENIOR/LEAD AUTHOR**

- Total citations (Google Scholar): 18200  
- *h*-index : 67  
Full list of publication on [Google Scholar](#)

1. Single-cell atlas of spinal cord injury creates a Tabulae Paralytica. Skinnider MA, Gautier M, Alan Yue Teo, Kathe C, Hutson TH, Laskaratos A, De Coucy A, Regazzi N, Aureli V, James N, Schneider B, Sofroniew M, Barraud Q, Bloch J, Anderson MA\*, Jordan W. Squair\*, **Courtine G\***. **Nature**. In Press.
2. A spinal cord neuroprosthesis for locomotor deficits due to Parkinson's disease. Milekovic T, Martin Moraud E, Macellari N, Moerman C, Raschellà F, Sun S, Perich MG, Varescon C, Demesmaeker R, Bruel A, Bole-Feysot LN, Schiavone G, Pirondini E, Cheng YL, Li H, Galvez A, Hernandez-Charpak SD, Dumont G, Ravier J, Le Goff-Mignardot CG, Mignardot JB, Carparelli G, Harte C, Hankov N, Aureli V, Watrin A, Lambert H, Borton D, Laurens J, Vollenweider I, Borgognon S, Bourre F, Goillandeau M, Ko WKD, Petit L, Qin Q, Buschman R, Buse N, Yaroshinsky M, Ledoux JB, Becce F, Castro Jimenez M, Bally JF, Denison T, Guehl D, Ijspeert A, Capogrosso M, Squair J, Asboth L, Starr PA, Wang DD, Lacour SP, Micera S, Qin C, Bloch J\*, Bezard E\*, and **Courtine G\***. **Nature medicine**, 2023 doi: 10.1038/s41591-023-02584-1.
3. Recovery of walking after paralysis by regenerating characterized neurons to their natural target region- Squair J, Milano M, de Coucy A, Gautier M, Skinnider MA, James ND, Cho N, Lasne A, Kathe C, Hutson TH, Ceto S, Baud L, Galan K, Aureli V, Laskaratos A, Barraud Q, Deming T, Kohman RE, Schneider BL, He Z, Bloch J, Sofroniew MV\*, **Courtine G\*** and Anderson MA\*. **Science**, 2023 DOI: 10.1126/science.adi6412
4. Walking naturally after spinal cord injury using a brain-spine interface. Lorach H, Galvez A Spagnolo V, Martel V, Karakas V, Interling N, Vat M, Faivre O, Harte C, Komi S, Ravier J, Collin T, Coquoz L, Sakr I, Baaklini E, Hernandez-Charpak SD, Dumont G, Buschman R, Buse N, Denison T, van Nes I, Asboth L, Watrin A, Struber L, Sauter-Starace F, Langar L, Auboiroux L, Carda S, Chabardes S, Aksenova T, Demesmaeker T, Charvet\* G, Bloch\* J, **Courtine\* G** **Nature** (2023) May 24. <https://doi.org/10.1038/s41586-023-06094-5>
5. The neurons that restore walking after paralysis. Kathe C, Skinnider M, Hutson T, Regazzi N, Gautier M, Demesmaeker R, Komi S, Ceto S, James ND, Cho N, Baud L, Galan K, Matson K, Rowald A, Kim K, Wang R, Prior J, Asboth L, Barraud Q, Lacour S, Levine A, Wagner F, Bloch J\*, Squair W\*, and **Courtine G\*** **Nature**, 1–8 (2022) doi:10.1038/s41586-022-05385-7..
6. Natural and targeted circuit reorganization after spinal cord injury. Anderson MA, Squair JW, Gautier M, Hutson TH, Kathe C, Barraud Q, Bloch J, **Courtine G**. **Nature Neuroscience**, 25, 1584–1596 (2022).
7. Principles of gait encoding in the subthalamic nucleus of people with Parkinson's disease. Thenaisie Y, Lee K, Moerman C, Scafa S, Gálvez A, Pirondini E, Burri M, Ravier J, Puiatti A, Accolla E, Wicki B, Zacharia A, Castro Jiménez M, Bally JF, **Courtine G**, Bloch J, Moraud EM. **Science Translational Medicine**. 2022 Sep 7;14(661)
8. Implanted System for Orthostatic Hypotension in Multiple-System Atrophy. Squair J, Berney M, Jimenez M, Hankov N, Demesmaeker R., Amir S, Paley A, Hernandez-Charpak S, Dumont G, Asboth L, Allenbach G, Becce F, Schoettker P., Wuerzner G, Bally J, **Courtine G.\*** and Bloch J.\* **New England Journal of Medicine** 2022, Apr 7;386(14):1339-1344. doi: 10.1056/NEJMoa2112809.

9. Preclinical neurobotic platform to develop therapies for upper-limb movement recovery. Pasquini M, James N, Dewany I, Coen FV, Cho N, Lai S, Anil S, Carpaneto J, Barraud Q, Lacour S, Micera S\* and **Courtine G\***. **Science Robotics**, 2022, Mar 30;7(64):eabk2378. doi: 10.1126/scirobotics.abk2378.
10. Activity-dependent spinal cord neuromodulation rapidly restores trunk and leg motor functions after complete paralysis. Rowald A, Komi S, Demesmaeker R, Hernandez-Charpak S, Paoles E, Montanaro H, Cassara A, Becce F, Lloyd B, Newton T, Ravier J, Kinany N, D'Ercole M, Paley A, Hankov N, Varescon C, McCracken L, Vat M, Caban M, Watrin A, Jacquet C, Bole-Feysot L, Harte C, Lorach H, Galvez A, Tschopp M, Herrmann N, Wacker M, Geernaert L, Fodor I, Radevich V, Van Den Keybus K, Eberle G, Pralong E, Roulet M, Ledoux JB, Fornari E, Mandija S, Mattera L, Martuzzi R, Nazarian B, Benkler S, Callegari S, Greiner N, Fuhrer B, Froeling M, Buse N, Denison T, Buschman R, Wende C, Ganty D, Bakker J, Delattre V, Lambert H, Minassian K, van den Berg C, Kavounoudias A, Micera S, Van De Ville D, Barraud Q, Kurt E, Kuster N, Neufeld E, Capogrosso M, Asboth L, Wagner F\*, Bloch J\* and **Courtine G\***. **Nature Medicine** 2022, Feb;28(2):260-271. doi: 10.1038/s41591-021-01663-5.
11. Wireless closed-loop optogenetics across the entire dorsoventral spinal cord in mice. Kathe C, Michoud F, Schönle P, Rowald A, Brun N, Ravier J, Furfaro I, Paggi V, Kim K, Soloukey S, Asboth L, Hutson TH, Jelescu I, Philippides A, Alwahab N, Gandar J, Huber D, De Zeeuw CI, Barraud Q, Huang Q, Lacour SP, **Courtine G**. **Nature Biotechnology** 2021 Sep 27. doi: 10.1038/s41587-021-01019-x.
12. Prioritization of cell types responsive to biological perturbations in single-cell data with Augur. Squair J.W., Skinnider M.A., Gautier M., Foster L.J., **Courtine G**. **Nature Protocols**. 2021 June 25 ; 1-42. doi : 10.1038/s41596-021-00561-x
13. Neuroprosthetic baroreflex controls haemodynamics after spinal cord injury. Squair JW, Gautier M, Mahe L, Soriano JE, Rowald A, Bichat A, Cho N, Anderson MA, James ND, Gandar J, Incognito AV, Schiavone G, Sarafis ZK, Laskaratos A, Bartholdi K, Demesmaeker R, Komi S, Moerman C, Vaseghi B, Scott B, Rosentreter R, Kathe C, Ravier J, McCracken L, Kang X, Vachicouras N, Fallegger F, Jelescu I, Cheng Y, Li Q, Buschman R, Buse N, Denison T, Dukelow S, Charbonneau R, Rigby I, Boyd SK, Millar PJ, Moraud EM, Capogrosso M, Wagner FB, Barraud Q, Bezard E, Lacour SP, Bloch J, **Courtine G\***, Phillips AA\*. **Nature** 2021 Feb; 590(7845):308-314. doi: 10.1038/s41586-020-03180-w.
14. Cell type prioritization in single-cell data. Skinnider M, Squair J, Kathe C, Anderson M, Gautier M, Matson K, Milano M, Hutson T, Barraud Q, Phillips A, Foster LJ, La Manno G, Levine A, **Courtine G**. **Nature Biotechnology** 2020. 2021 Jan;39(1):30-34. doi: 10.1038/s41587-020-0605-1.
15. Spinal cord repair: advances in biology and technology. **Courtine G**, Sofroniew MV. **Nature Medicine**. 2019 Jun;25(6):898-908. doi: 10.1038/s41591-019-0475-6. Epub 2019 Jun 3. Review. PMID:3116081787.
16. Cbp-dependent histone acetylation mediates axon regeneration induced by environmental enrichment in rodent spinal cord injury models. Hutson TH, Kathe C, Palmisano I, Bartholdi K, Hervera A, De Virgiliis F, McLachlan E, Zhou L, Kong G, Barraud Q, Danzi MC, Medrano-Fernandez A, Lopez-Atalaya JP, Boutillier AL, Sinha SH, Singh AK, Chaturbedy P, Moon LDF, Kundu TK, Bixby JL, Lemmon VP, Barco A, **Courtine G\***, Di Giovanni S\*. **Science Translational Medicine**. 2019 Apr 10;11(487). pii: eaaw2064. doi: 10.1126/scitranslmed.aaw2064.86.
17. Electrical spinal cord stimulation must preserve proprioception to enable locomotion in humans with spinal cord injury. Formento E, Minassian K, Wagner F, Mignardot JB, Le Goff CG, Rowald A, Bloch J, Micera S\*, Capogrosso M\* and **Courtine G\***. **Nature neuroscience**. 2018 December. 21 (12-1728-1741).

18. Targeted neurotechnology restores walking in humans with spinal cord injury. Wagner FB, Mignardot JB, Le Goff-Mignardot CG, Demesmaeker R, Komi S, Capogrosso M, Rowald A, Seáñez I, Caban M, Pirondini E, Vat M, McCracken L, Heimgartner R, Fodor I, Watrin A, Seguin P, Paoles E, Van Den Keybus K, Eberle G, Schurch B, Pralong E, Becce F, Prior J, Buse N, Buschman R, Neufeld E, Kuster N, Carda S, von Zitzewitz J, Delattre V, Denison T, Lambert H, Minassian K\*, Bloch J\* and **Courtine G\***. **Nature**. 2018 October 31. 563(7729-65-71).
19. Configuration of electrical spinal cord stimulation through real time processing of gait kinematics. Capogrosso, M., Wagner, F.B., Gandar, J., Moraud E.M., Wenger, N., Milekovic T., Shkorbatova P., Pavlova, N., Musienko P., Bezard E., Bloch J., Courtine, G. **Nature Protocols**. 2018 Sep;13(9):2031-2061. doi:10.1038/s41596-018-0030-9.
20. Required growth facilitators propel axon regeneration across complete spinal cord injury. Anderson M, O'Shea T., Burda J, Ao Y, Barlately S, Bernstein A, Kim J, James N, Rogers A, Kato B, Wollenberg A, Kawaguchi R, Coppola G, Wang C, Deming T, He Z, **Courtine G\***, Sofroniew M\*. **Nature**. 2018 Sep;561(7723):396-400. doi:10.1038/s41586-018-0467-6. Epub 2018 Aug 29. PMID:30158698.
21. Brain-controlled modulation of spinal circuits improves recovery from spinal cord injury. Bonizzato M, Pidpruzhnykova G, DiGiovanna J, Shkorbatova P, Pavlova N, Micera S\*, **Courtine G\***. **Nature Communications**. 2018 Aug 1;9(1):3015. doi:10.1038/s41467-018-05282-6. PMID: 30068906
22. Cortico-reticulo-spinal circuit reorganization enables functional recovery after severe spinal cord contusion. Asboth L, Friedli L, Beauparlant J, Martinez-Gonzalez C, Anil S, Rey E, Baud L, Pidpruzhnykova G, Anderson MA, Shkorbatova P, Batti L, Pagès S, Kreider J, Schneider BL, Barraud Q, **Courtine G**. **Nature Neuroscience** 2018 Apr;21(4):576-588. doi: 10.1038/s41593-018-0093-5. Epub 2018 Mar 19. PMID: 29556028.
23. A multidirectional gravity-assist algorithm that enhances locomotor control in patients with stroke or spinal cord injury. Mignardot JB, Le Goff CG, van den Brand R, Capogrosso M, Fumeaux N, Vallery H, Anil S, Lanini J, Fodor I, Eberle G, Ijspeert A, Schurch B, Curt A, Carda S, Bloch J\*, von Zitzewitz J\*, **Courtine G\***. **Science Translational Medicine**. 2017 Jul 19;9(399). pii: eaah3621. doi: 10.1126/scitranslmed.aah3621. PMID: 28724575
24. A brain-spine interface alleviating gait deficits after spinal cord injury in primates. Capogrosso M, Milekovic T, Borton D, Wagner F, Moraud EM, Mignardot JB, Buse N, Gandar J, Barraud Q, Xing D, Rey E, Duis S, Jianzhong Y, Ko WK, Li Q, Detemple P, Denison T, Micera S, Bezard E, Bloch J, **Courtine G**. **Nature**. 2016 November 10;539(7628):284-288. doi: 10.1038/nature20118. PMID: 27830790
25. Mechanisms Underlying the Neuromodulation of Spinal Circuits for Correcting Gait and Balance Deficits after Spinal Cord Injury. Moraud EM, Capogrosso M, Formento E, Wenger N, DiGiovanna J, **Courtine G\***, Micera S\*. **Neuron**. 2016 Feb 17;89(4):814-28. doi: 10.1016/j.neuron.2016.01.009. Epub 2016 Feb 4. PMID: 26853304
26. Spatiotemporal neuromodulation therapies engaging muscle synergies improve motor control after spinal cord injury. Wenger N, Moraud EM, Gandar J, Musienko P, Capogrosso M, Baud L, Le Goff CG, Barraud Q, Pavlova N, Dominici N, Minev IR, Asboth L, Hirsch A, Duis S, Kreider J, Mortera A, Haverbeck O, Kraus S, Schmitz F, DiGiovanna J, van den Brand R, Bloch J, Detemple P, Lacour SP, Bézard E, Micera S, **Courtine G**. **Nature Medicine**. 2016 Feb;22(2):138-45. doi: 10.1038/nm.4025. Epub 2016 Jan 18. PMID: 26779815
27. Pronounced species divergence in corticospinal tract reorganization and functional recovery after lateralized spinal cord injury favors primates. Friedli L, Rosenzweig ES, Barraud Q, Schubert M, Dominici N, Awai L, Nielson JL, Musienko P, Nout-Lomas Y, Zhong H, Zdunowski S, Roy RR, Strand SC, van den Brand R, Havton LA, Beattie MS, Bresnahan JC, Bézard E, Bloch J, Edgerton VR, Ferguson AR, Curt A, Tuszynski MH, **Courtine G**. **Science Translational Medicine**. 2015 Aug 26;7(302):302ra134. doi: 10.1126/scitranslmed.aac5811. PMID: 26311729

28. Defining ecological strategies in neuroprosthetics. **Courtine G**, Bloch J. **Neuron**. 2015 Apr 8;86(1):29-33. doi: 10.1016/j.neuron.2015.02.039. Review. PMID: 25856483.
29. Electronic dura mater for long-term multimodal neural interfaces. Mineev IR, Musienko P, Hirsch A, Barraud Q, Wenger N, Moraud EM, Gandar J, Capogrosso M, Milekovic T, Asboth L, Torres RF, Vachicouras N, Liu Q, Pavlova N, Duis S, Larmagnac A, Vörös J, Micera S, Suo Z, **Courtine G\***, Lacour SP\*. **Science**. 2015 Jan 9;347(6218):159-63. doi: 10.1126/science.1260318. PMID: 25574019
30. Wireless neurosensor for full-spectrum electrophysiology recordings during free behavior. Yin M, Borton DA, Komar J, Agha N, Lu Y, Li H, Laurens J, Lang Y, Li Q, Bull C, Larson L, Rosler D, Bezard E, **Courtine G**, Nurmikko AV. **Neuron**. 2014 Dec 17;84(6):1170-82. doi: 10.1016/j.neuron.2014.11.010. Epub 2014 Dec 4. PMID: 25482026.
31. Muscle spindle feedback directs locomotor recovery and circuit reorganization after spinal cord injury. Takeoka A, Vollenweider I, **Courtine G\***, Arber S\*. **Cell**. 2014 Dec 18;159(7):1626-39. doi:10.1016/j.cell.2014.11.019. PMID: 25525880
32. Closed-loop neuromodulation of spinal sensorimotor circuits controls refined locomotion after complete spinal cord injury. Wenger N, Moraud EM, Raspopovic S, Bonizzato M, DiGiovanna J, Musienko P, Morari M, Micera S\*, **Courtine G\***. **Science Translational Medicine**. 2014 Sep 24;6(255):255ra133. doi: 10.1126/scitranslmed.3008325. PMID: 25253676
33. Personalized neuroprosthetics. Borton D, Micera S, Millán Jdel R, **Courtine G**. **Science Translational Medicine**. 2013 Nov 6;5(210):210rv2. doi: 10.1126/scitranslmed.3005968. Review. PMID: 24197737
34. Versatile robotic interface to evaluate, enable and train locomotion and balance after neuromotor disorders. Dominici N, Keller U, Vallery H, Friedli L, van den Brand R, Starkey ML, Musienko P, Riener R, **Courtine G**. **Nature Medicine**. 2012 Jul;18(7):1142-7. doi: 10.1038/nm.2845. PubMed PMID: 22653117.
35. Restoring voluntary control of locomotion after paralyzing spinal cord injury. van den Brand R, Heutschi J, Barraud Q, DiGiovanna J, Bartholdi K, Huerlimann M, Friedli L, Vollenweider I, Moraud EM, Duis S, Dominici N, Micera S, Musienko P, **Courtine G**. **Science**. 2012 Jun 1;336(6085):1182-5. doi: 10.1126/science.1217416. PubMed PMID: 22654062.
36. Extensive spontaneous plasticity of corticospinal projections after primate spinal cord injury. Rosenzweig ES, **Courtine G**, Jindrich DL, Brock JH, Ferguson AR, Strand SC, Nout YS, Roy RR, Miller DM, Beattie MS, Havton LA, Bresnahan JC, Edgerton VR, Tuszynski MH. **Nature Neuroscience**. 2010 Dec;13(12):1505-10. doi: 10.1038/nn.2691. Epub 2010 Nov 14. PubMed PMID: 21076427; PubMed Central PMCID: PMC3144760.
37. Transformation of nonfunctional spinal circuits into functional states after the loss of brain input. **Courtine G**, Gerasimenko Y, van den Brand R, Yew A, Musienko P, Zhong H, Song B, Ao Y, Ichiyama RM, Lavrov I, Roy RR, Sofroniew MV, Edgerton VR. **Nature Neuroscience**. 2009 Oct;12(10):1333-42. doi: 10.1038/nn.2401. Epub 2009 Sep 20. PubMed PMID: 19767747; PubMed Central PMCID: PMC2828944.
38. Recovery of supraspinal control of stepping via indirect propriospinal relay connections after spinal cord injury. **Courtine G**, Song B, Roy RR, Zhong H, Herrmann JE, Ao Y, Qi J, Edgerton VR, Sofroniew MV. **Nature Medicine**. 2008 Jan;14(1):69-74. Epub 2008 Jan 6. PubMed PMID: 18157143; PubMed Central PMCID: PMC2916740.

\*contributed equally to the work

### 13. ALL PEER-REVIEWED PUBLICATIONS

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1. Single-cell atlas of spinal cord injury creates a Tabulae Paralytica. Skinnider MA, Gautier M, Alan Yue Teo, Kathe C, Hutson TH, Laskaratos A, De Coucy A, Regazzi N, Aureli V, James N, Schneider B, Sofroniew M, Barraud Q, Bloch J, Anderson MA\*, Jordan W. Squair\*, **Courtine G\***. Nature. In Press.
2. A spinal cord neuroprosthesis for locomotor deficits due to Parkinson's disease. Milekovic T, Martin Moraud E, Macellari N, Moerman C, Raschellà F, Sun S, Perich MG, Varescon C, Demesmaeker R, Bruel A, Bole-Feysot LN, Schiavone G, Pirondini E, Cheng YL, Li H, Galvez A, Hernandez-Charpak SD, Dumont G, Ravier J, Le Goff-Mignardot CG, Mignardot JB, Carparelli G, Harte C, Hankov N, Aureli V, Watrin A, Lambert H, Borton D, Laurens J, Vollenweider I, Borgognon S, Bourre F, Goillandeau M, Ko WKD, Petit L, Qin Q, Buschman R, Buse N, Yaroshinsky M, Ledoux JB, Becce F, Castro Jimenez M, Bally JF, Denison T, Guehl D, Ijspeert A, Capogrosso M, Squair J, Asboth L, Starr PA, Wang DD, Lacour SP, Micera S, Qin C, Bloch J\*, Bezard E\*, and **Courtine G\***. Nature medicine, 2023
3. Recovery of walking after paralysis by regenerating characterized neurons to their natural target region- Squair J, Milano M, de Coucy A, Gautier M, Skinnider MA, James ND, Cho N, Lasne A, Kathe C, Hutson TH, Ceto S, Baud L, Galan K, Aureli V, Laskaratos A, Barraud Q, Deming T, Kohman RE, Schneider BL, He Z, Bloch J, Sofroniew MV\*, **Courtine G\*** and Anderson MA\*. Science, 2023 DOI: 10.1126/science.adi6412
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\*contributed equally to the work



## 14. PATENTS AND LICENSES

### Invention disclosures

#	Filing number	Title	Disclosure date
1	6.1365.11	Epidural electrical stimulation control system for restoration of three-dimensional arm movements	19.02.2019
2	6.1968	Autonomic neuroprosthesis to modulate and rehabilitate sympathetic function after spinal cord injury	30.01.2019
3	6.1968.1	Closed loop control of autonomic function after spinal cord injury	22.04.2019
4	6.1968.2	Optimization protocol of epidural stimulation for cardiovascular responses after spinal cord injury	22.04.2019
5	6.2064	Cell type prioritization in single-cell data	20.12.2019
6	6.1365.12	A method for optimizing single-pattern neurostimulation parameters	24.03.2020
7	6.2127	Neuromodulation system	20.07.2020
8	6.2136	Spinal cord stimulation to alleviate motor deficits of Parkinson's disease	27.07.2020
9	6.1968.3	Apparatus and methods for maintaining physiological functions	23.11.2020
10	6.1968.4	Optimization of urodynamic function stimulation after spinal cord injury	10.12.2020
11	6.1968.5	Closed loop control of urodynamic function after spinal cord injury	10.12.2020
12	6.1365.13	A system for targeted spinal stimulation to reduce spasticity	09.03.2021
13	6.1968.6	Autonomic neuroprosthesis to modulate and rehabilitate sympathetic function after spinal cord injury	16.03.2021
14	6.2192	Implantable blood pressure monitor	20.02.2020
15	6.1365.14	Systems and methods using sub-threshold neuromodulation	15.06.2021
16	6.1365.15	A neuromodulation system for planning and/or adjusting and/or providing a neuromodulation therapy	17.06.2021
17	6.2227	Deep brain stimulation of the lateral hypothalamus to augment motor function after spinal cord injury	14.06.2021
18	6.1365.16.1	Design : ARCIM Leads electrode array distribution and wiring diagram	08.07.2021
19	6.1365.16	ARC-IM Lead Patent	07.07.2021
20	6.2227.1	Closed-loop integration of deep brain stimulation and epidural electrical spinal cord stimulation to activate the sympathetic and motor systems in neurodegenerative disorders	13.07.2021
21	6.1365.1	An active closed-loop medical system	16.11.2016
22	6.1365.17	System and method for optimization of patient-specific neurostimulation parameters	04.10.2022
23	6.2313	Biological repair of the injured spinal cord	24.11.2022
24	6.2420	Neuromodulation/neurostimulation system for restoring a motor function and facilitating neurological recovery	20.03.2023
25	6.2435	Neuromodulation/neurostimulation system for controlling a respiratory function	19.04.2023

### Patents

#	Filing number	Title	Country	Filing date	Status	International designation	Granted date
1	6.1365.11	A system for providing neuromodulation, especially neurostimulation	EP	13.02.2019	Submitted		

2	6.1182.2	System to deliver adaptive epidural and/or subdural electrical spinal cord stimulation to facilitate and restore locomotion after a neuromotor impairment	US	04.03.2019	Granted	WO2015/063127	21.12.2021
3	6.1968	System and method for control of autonomic function	EP	15.05.2019	Submitted		
4	6.1365.10	An electrode array, a lead paddle and a neuromodulation system	US	30.05.2019	Submitted		
5	6.1365.2	A sensory information compliant spinal cord stimulation system for the rehabilitation of motor functions	EP	06.06.2019	Granted	WO2018/114906	02.03.2022
6	6.1365.2	A sensory information compliant spinal cord stimulation system for the rehabilitation of motor functions	HK	19.06.2019	Submitted	WO2018/114906	
7	6.1365.2	A sensory information compliant spinal cord stimulation system for the rehabilitation of motor functions	US	22.06.2019	Submitted	WO2018/114906	
8	6.1365.2	A sensory information compliant spinal cord stimulation system for the rehabilitation of motor functions	CN	24.06.2019	Submitted	WO2018/114906	
9	6.1365	System for selective spatiotemporal stimulation of the spinal cord	US	10.07.2019	Granted	US10981004B2	20.04.2021
10	6.1968.3	Apparatus and methods for maintaining physiological functions	US	16.08.2019	Granted		01.02.2022
11	6.1968.3	Apparatus and methods for maintaining physiological functions	EP	16.08.2019	Submitted		
12	6.2127	Neuromodulation system	EP	27.11.2019	Submitted		
13	6.1365.11	A system for providing neuromodulation, especially neurostimulation	PCT	11.02.2020	Final phase	WO2019/110402	
14	6.1968.1	System and method for closed loop control of autonomic function	PCT	14.05.2020	Final phase	WO2020/229645	
15	6.1968	System and method for control of autonomic function	PCT	14.05.2020	Final phase	WO2020/229646	
16	6.2192	Implantable blood pressure monitor	US	20.05.2020	Submitted		
17	6.1365.7	A system for planning and/or providing neuromodulation	US	02.06.2020	Submitted	WO2019/110400	
18	6.1365.8	A system for planning and/or providing neuromodulation	US	02.06.2020	Granted	WO2019/110397	29.11.2022
19	6.1365.9	A system for planning and/or providing neuromodulation, especially neurostimulation	US	03.06.2020	Granted	WO2019/110402	23.08.2022
20	6.1365.6	A system for planning and/or providing neurostimulation for a patient	US	03.06.2020	Granted	WO2019/110401	16.08.2022
21	6.1365.8	A system for planning and/or providing neuromodulation	EP	15.06.2020	Submitted	WO2019/110397	
22	6.1365.6	A system for planning and/or providing neurostimulation for a patient	EP	15.06.2020	Granted	WO2019/110401	01.03.2023
23	6.1365.7	A system for planning and/or providing neuromodulation	EP	15.06.2020	Submitted	WO2019/110400	

24	6.1365.9	A system for planning and/or providing neuromodulation, especially neurostimulation	EP	16.06.2020	Granted	WO2019/110402	24.08.2022
25	6.2127	Neuromodulation system	US	13.11.2020	Submitted		
26	6.2127	Neuromodulation system	US	27.11.2020	Submitted		
27	6.1365.7	A system for planning and/or providing neuromodulation	US	29.03.2021	Submitted	WO2019/110400	
28	6.1365.15	A neuromodulation system for planning and/or adjusting and/or providing a neuromodulation therapy	US	22.04.2021	Submitted		
29	6.2192	Implantable blood pressure monitor	PCT	20.05.2021	Submitted		
30	6.1365.16.1	Design: A lead paddle	US	24.06.2021	Submitted		
31	6.1365.16	Devices and systems for electrical stimulation and methods of use	US	24.06.2021	Submitted		
32	6.1365.16.1	Design: ARCIM Leads electrode array distribution and wiring diagram	EP	25.06.2021	Submitted		
33	6.1365.16	Devices and systems for electrical stimulation and methods of use	EP	25.06.2021	Submitted		
34	6.1365.11	A system for providing neuromodulation, especially neurostimulation	US	13.08.2021	Submitted		
35	6.1182.2	System to deliver adaptive epidural and/or subdural electrical spinal cord stimulation to facilitate and restore locomotion after a neuromotor impairment	EP	14.09.2021	Submitted	WO2015/063127	
36	6.1182.2	System to deliver adaptive epidural and/or subdural electrical spinal cord stimulation to facilitate and restore locomotion after a neuromotor impairment	EP/FR	01.10.2021	Granted	WO2015/063127	15.09.2021
37	6.1182.2	System to deliver adaptive epidural and/or subdural electrical spinal cord stimulation to facilitate and restore locomotion after a neuromotor impairment	EP/GB	01.10.2021	Granted	WO2015/063127	15.09.2021
38	6.1182.2	System to deliver adaptive epidural and/or subdural electrical spinal cord stimulation to facilitate and restore locomotion after a neuromotor impairment	EP/DE	04.10.2021	Granted	WO2015/063127	15.09.2021
39	6.1968.1	System and method for closed loop control of autonomic function	EP	25.10.2021	Submitted	WO2020/229645	
40	6.1968	System and method for control of autonomic function	EP	25.10.2021	Submitted	WO2020/229646	
41	6.1968	System and method for control of autonomic function	JP	10.11.2021	Submitted	WO2020/229646	
42	6.1968.1	System and method for closed loop control of autonomic function	CN	12.11.2021	Submitted	WO2020/229645	
43	6.1968.1	System and method for closed loop control of autonomic function	US	15.11.2021	Submitted	WO2020/229645	
44	6.1968	System and method for control of autonomic function	CN	15.11.2021	Submitted	WO2020/229646	

45	6.1968	System and method for control of autonomic function	US	15.11.2021	Submitted	WO2020/229646	
46	6.1968.3	Apparatus and methods for maintaining physiological functions	US	16.12.2021	Submitted		
47	6.1365.16.1	Design: A lead paddle	CN	22.12.2021	Submitted		
48	6.1365.2	A sensory information compliant spinal cord stimulation system for the rehabilitation of motor functions	EP	01.03.2022	Submitted	WO2018/114906	
49	6.1365.2	A sensory information compliant spinal cord stimulation system for the rehabilitation of motor functions	EP/FR	03.05.2022	Granted	WO2018/114906	02.03.2022
50	6.1365.2	A sensory information compliant spinal cord stimulation system for the rehabilitation of motor functions	EP/GB	03.05.2022	Granted	WO2018/114906	02.03.2022
51	6.1365.2	A sensory information compliant spinal cord stimulation system for the rehabilitation of motor functions	EP/DE	06.05.2022	Granted	WO2018/114906	02.03.2022
52	6.1496	Apparatus to apply forces in a three-dimensional space	EP/DE	24.05.2022	Granted	WO/2017/005661	18.05.2022
53	6.1496	Apparatus to apply forces in a three-dimensional space	EP/CH-LI	30.05.2022	Granted	WO/2017/005661	18.05.2022
54	6.1496	Apparatus to apply forces in a three-dimensional space	EP/FR	30.05.2022	Granted	WO/2017/005661	18.05.2022
55	6.1496	Apparatus to apply forces in a three-dimensional space	EP/GB	30.05.2022	Granted	WO/2017/005661	18.05.2022
56	6.1365.16	Devices and systems for electrical stimulation and methods of use	CN	23.06.2022	Submitted		
57	6.1496	Apparatus to apply forces in a three-dimensional space	EP/NL	15.07.2022	Granted	WO/2017/005661	18.05.2022
58	6.1365.9	A system for planning and/or providing neuromodulation, especially neurostimulation	EP/DE	24.10.2022	Granted	WO2019/110402	24.08.2022
59	6.1365.9	A system for planning and/or providing neuromodulation, especially neurostimulation	EP/FR	24.10.2022	Granted	WO2019/110402	24.08.2022
60	6.1365.9	A system for planning and/or providing neuromodulation, especially neurostimulation	EP/GB	24.10.2022	Granted	WO2019/110402	24.08.2022
61	6.1968.5	System for micturition control in a mammal with bladder dysfunction	EP	07.11.2022	Submitted		
62	6.1365.13	System for control of spasticity	EP	21.11.2022	Submitted		
63	6.1365.6	A system for planning and/or providing neurostimulation for a patient	EP/FR	01.03.2023	Granted	WO2019/110401	01.03.2023
64	6.1365.6	A system for planning and/or providing neurostimulation for a patient	EP/GB	01.03.2023	Granted	WO2019/110401	01.03.2023
65	6.1365.4	A Neurostimulation System for Central Nervous Stimulation (CNS) and Peripheral Nervous Stimulation (PNS)	EP	09.03.2023	Submitted		
66	6.1968	System and method for control of autonomic function	EP	09.03.2023	Submitted	WO2020/229646	
67	6.1365.6	A system for planning and/or providing neurostimulation for a patient	EP/DE	11.03.2023	Granted	WO2019/110401	01.03.2023

68	6.2435	Neuromodulation/neurostimulation system for controlling a respiratory function	US	18.04.2023	Submitted		
69	6.2435	Neuromodulation/neurostimulation system for controlling a respiratory function	EP	18.04.2023	Submitted		
70	6.2420	Neuromodulation/neurostimulation system for restoring a motor function and facilitating neurological recovery	EP	28.04.2023	Submitted		
71	6.2227	Neuromodulation/neurostimulation system for mitigating locomotor deficits of Parkinson's disease, spinal cord injury (SCI), stroke and/or other neurological disorders	PCT	28.04.2023	Submitted		
72	6.2313	Neurotrauma treatment	EP	08.05.2023	Submitted		

## 15. ORAL CONTRIBUTIONS TO INTERNATIONAL CONFERENCES (SELECTION)

### International Conferences in 2023

- Penfield Conferences 2023, Banff, Canada
- World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases, Barcelona, Spain
- GESDA 2023 – Geneva Science and Diplomacy Anticipator, Villars, Switzerland
- IRME conference 2023, Paris, France

### International Conferences in 2022

- Gordon Research Conferences 2022, Oxnard, CA, U.S.A.
- 10th Wellington Partners Life Science Day 2022, Munich
- 15th INS World Congress 2022, Barcelona, Spain
- 2022 Neuromodulation Symposium Louisville, U.S.A.
- VIB Conference Neurotechnologies 2022, Leuven, Belgium
- WSSFN 2022, Seoul, Korea

### International Conferences in 2021

- Presidential lecture, Society for Neuroscience
- L'homme cérébral 2021
- 2021 Neuromodulation Symposium Minnesota, U.S.A.
- At the interface of Brain and Machine 2021
- NCM, Making Movement happen, NIH USA
- GT Neuroseminar Series, Georgia Tech, U.S.A

### International Conferences in 2020

- BNI seminar, Cornell U.S.A.

### International Conferences in 2019

- Biogen La médecine de précision en Neurologie
- Frontiers –Science unlimited
- Rome Fondazione Santa Lucia
- Fondation pour la recherche en Neurosciences
- Académie Française de Médecine

### International Conferences in 2018

- XXIII Congress of the European Society for Stereotactic and functional neurosurgery.
- Neuroscience School of Advanced Studies, Venice, Italy

- 4<sup>th</sup> International Spinal Cord Injury and Neurotrauma Summer School, Scotland
- Annual Conference Of The International Functional Electrical Stimulation Society
- Bioelectronic Medicine: Technology Targeting Molecular Mechanisms - Second Symposium Sweden
- European Society of Gene and Cell Therapy (ESGCT), Switzerland
- Imperial College London's 2018 Neurotechnology Colloquium, UK
- ISRT Network Meeting in London, UK
- Medtronic conference, Netherlands

#### **International Conferences in 2017**

- Bioelectronic Medicine: Technology Targeting Molecular Mechanisms - Second Symposium
- Bordeaux Neurocampus Inaugural Conference
- CNB annual meeting, 8th of September 2017
- European Congress of NeuroRehabilitation 2017
- FENS-Kavli Network Symposium
- International Neuromodulation Society's 13th World Congress
- Imperial College Centre for Neurotechnology
- 4th International Spinal Cord Repair Meeting
- ISPRG World Congress
- 8th Symposium on Bioengineering
- The Satellite Meeting "Spinal Cord Injury: From Mechanisms to Treatments"
- UCSD-PVA Neural Injury and Regeneration Symposium

## **16. OUTREACH ACTIVITIES**

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- 2023 EPFL open days
- 2023 Conférence l'homme Cérébral, Monaco
- 2023 Lausanne, Switzerland: EPFL Presentation Spinal Muscular Atrophy (SMA), Orthogonal interventions for late-onset SMA
- 2023 Nottwil, Switzerland: Keynote, Deutschsprachige Medizinische Gesellschaft für Paraplegiologie (DMGP)
- 2022 London Trauma Conference: Keynote, Spinal Cord Injury, London, UK
- 2022 The Christopher & Dana Reeve Foundation, New York, USA
- 2018-2023 Soirée de l'espoir /bal de printemps, IRP, Lausanne, Switzerland
- 2019 Brain awareness week (public conference, Dijon, France)
- 2018 36.9 documentary on clinical trial STIMO (diffusion early November)
- 2018 Nuit de la Science, Campus Biotech, Geneva
- 2017 Blackrock Microsystems wireless technology displayed at the London Science Museum
- 2017 Speaker at SXSW, Austin, USA.
- 2013 Ted Global Conference, Edinburgh, Scotland
- 2013 Documentary remarcher, Palme d'or Deauville Film Festival
- 2012-2018 High school students (16-17 year old) – visit at the Courtine Lab (1/2 day)
- 2012 TEDx CHUV, Lausanne
- 2012 Web-documentary <http://www.project-rewalk.com/fr/home>