



Faculty Personnel Record

NAME Dion Khodagholy

Title Dr.

Department Electrical Engineering

Secondary Title (if applicable)

Columbia University, New York, NY 10027

Website: <http://dion.ee.columbia.edu>

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Date: April 20149

Education:

| <u>School</u> | <u>Degree</u> | <u>Date</u> | <u>Date</u> |
|--------------------------------------|---------------------|-------------|--|
| University of Birmingham, UK | Masters | 06/2008 | Electronic and Communication Engineering |
| École Nationale Supérieure des Mines | Masters | 12/2009 | Microelectronics Technology and Manufacturing Management |
| Centre Microélectronique de Provence | -- | 09/2009 | Printed electronics |
| Cornell University | -- | 01/2010 | Nanofabrication |
| École Nationale Supérieure des Mines | PhD | 09/2012 | Microelectronics and Bioelectronics |
| New York University, New York | Postdoctoral fellow | 04/2017 | Neuroscience |

Title of Ph.D. Thesis:

Organic Bioelectronics

Principal Fields of Interest:

Bioelectronics, Systems Neuroscience, flexible electronics

Career History: (list in reverse chronological order)

| Employer | Position | Beginning | Ending |
|---|--|-----------|---------|
| Columbia University | Assistant professor | 2017 | present |
| New York University Langone Medical Center | Postdoctoral Fellow and Junior Fellow of the Simons Society of Fellows, | 2013 | 2017 |

NAME Dion Khodagholy

Awards/Honors Received:

Out-standing postdoctoral award, New York University Langone Medical Center (2017)

Best Presentation Award, Cornell Nanofabrication Facility Annual Meeting (2015)

Fellow of the Simons Society of Fellows (Junior Fellow, 2014)

Best Thesis Award, PACA region, France (2013)

MRS Postdoctoral Travel Award (2013)

Young Scientist Award, European Material Research Society (EMRS; 2012)

Grand Ecole Doctoral Fellowship (2009)

NAME Dion Khodagholy

Publications

(underline students or postdocs supervised)

Papers in Refereed Journals: (List in Chronological Order)

1. Spyropoulos G., Gelinas J, Khodagholy D. *, "Internal-ion gated organic electrochemical transistor: a building block for integrated bioelectronics", Science Advances, 5 (2), eaau7378 (2019)
2. K. Tybrandt*, D. Khodagholy*, B. Dielacher, F. Stauffer, AF. Renz, G. Buzsáki, J. Vörös, "High-Density Stretchable Electrode Grids for Chronic Neural Recording", Advanced Materials, (2018)
3. D. Khodagholy*, J. N. Gelinas* and G. Buzsáki "Learning-enhanced coupling between ripple oscillations in association cortices and hippocampus" Science, 372, 369-372 (2017)
4. I. Uguz, C. M Proctor, V. F Curto, A. Pappa, M. J Donahue, M. Ferro, R. M Owens, D. Khodagholy, S. Inal, G. G Malliaras, "A Microfluidic Ion Pump for In Vivo Drug Delivery", Advanced Materials, Adv. Mater. 29- 27- 1701217 (2017)
5. D. Khodagholy, J. N. Gelinas, Z. Zhao, M. Yeh, M. Long, J D. Greenlee, W. Doyle, O. Devinsky , and G. Buzsáki, "Organic electronics for high-resolution electrocorticography of the human brain" Science Advances, 2, e1601027 (2016).
6. A. Jonsson, S. Inal, I. Uguz, A. J. Williamson, L. Kergoat, J. Rivnay, D. Khodagholy, M. Berggren, C. Bernard, G. G. Malliaras, D. T. Simon, Bioelectronic neural pixel: Chemical stimulation and electrical sensing at the same site, Proc. Natl. Acad. Sci. , 201604231 (2016).
7. J. N. Gelinas, D. Khodagholy, T. Thesen, W. Doyle, O. Devinsky, G. Malliaras and G. Buzsáki, "Interictal epileptiform discharges induce hippocampal-cortical coupling", Nature Med, doi:10.1038/nm.4084, (2016).
8. D. Khodagholy, J. Gelinas, T. Thesen, W. Doyle, O. Devinsky, G. Malliaras and G. Buzsáki, "NeuroGrid: recording action potentials from the surface of the brain", Nature Neuro. DIO: 10.1038/nn.3905, (2015)
9. G. Buzsáki, E. Stark, A. Berényi, D. Khodagholy, D. Kipke, E. Yoon and Kensall Wise, "Tools for probing local circuits: high-density silicon probes combined with optogenetics", Neuron, (2015)
10. J. Rivnay, P. Leleux, M. Ferro, M. Sessolo, A. Williamson, D Khodagholy, Marc Ramuz, X. Strakosas,

- R. Owens, C. Benar, J. Badier, C. Bernard, and G.G. Malliaras, "High performance transistors through control of volumetric capacitance, *Science Adv.*, (2015)
11. J. Rivnay, P. Leleux, M. Sessolo, D. Khodagholy, T. Herve, M. Fiocchi, and G. G. Malliaras, "Organic Electrochemical Transistors with Maximum Transconductance at Zero Gate Bias" *Adv. Mater.*, 25, 48, 7010-4, (2013)
 12. D. Khodagholy, J. Rivnay, M. Sessolo, M. Gurfinkel, E. Stavrinidou, P. Leleux, T. Herve, S. Sanaur, and G.G. Malliaras, "High transconductance organic electrochemical transistor", *Nature Comm.* 4, 2133, (2013)
 13. E. Stavrinidou, P. Leleux, H. Rajaona, D. Khodagholy, J. Rivnay, M. Lindau, S. Sanaur, and G. G. Malliaras, "Direct measurement of ion mobility in a conducting polymer", *Adv. Mater.*, 25, 32, 4488–4493, (2013)
 14. M. Sessolo*, D. Khodagholy*, J. Rivnay, F. Maddalena, M. Gleyzes, E. Steidl, B. Buisson and G. G. Malliaras, "General fabrication of polymer microelectrode arrays", *Adv. Mater.*, 25, 15, 2135–2139, (2013)
 15. D. Khodagholy, T. Doublet, M. Gurfinkel, P. Leleux, P. Quilichini, A. Ghestem, E. Ismailova, T. Herve, S. Sanaur, C. Bernard and G. G. Malliaras, "In vivo recordings of brain activity using organic transistors", *Nature comm.*, 4, 1575, (2013)
 16. L. H. Jimison, S. A. Tria, D. Khodagholy, M. Gurfinkel, E. Lanzarini, A. Hama. G. G. Malliaras, R. M. Owens, "Measurement of Barrier Tissue Integrity with an Organic Electrochemical Transistor", *Adv. Mater.*, 24, 44, 5919–5923, (2012)
 17. L. H. Jimison, A. Hama, X. Strakosas, V. Armelb, D. Khodagholy, E. Ismailova, B. Winther-Jensenb, and R. M. Owens, "PEDOT:TOS with PEG: A biofunctional surface with improved electronic characteristics" *J. Mater. Chem.*, 2012,22, 19498-19505 (2012)
 18. E. Ismailova, T. Doublet, D. Khodagholy, P. Quilichini, A. Ghestem, S.Y. Yang, C. Bernard, and G.G. Malliaras, "Plastic neuronal probes for implantation in cortical and subcortical areas of the rat brain", *Int. J. Nanotechnology*, 9, 517 (2012).
 19. D. Khodagholy, V.F. Curto, K. J. Fraser, M. Gurfinkel, R. Byrne, D. Diamond, G. G. Malliaras, F. Benito-Lopez, and R. M. Owens, "Organic electrochemical transistor incorporating an ionogel as solid state electrolyte for lactate sensing", *J. Mater. Chem.*, 22, 4440-4443 (2011)
 20. K. Fraser, V. Curto, Sh. Coyle, B. Schazman, R. Byrne, F. Benito-Lopez, Fernando, D. Khodagholy, R. Owens, G. G. Malliaras D. Diamond "Electrochemical transistors with ionic liquids for enzymatic sensing", *SPIE Proc.*, doi:10.1117/12.894412 (2011)

21. D. Khodagholy, M. Gurfinkel, E. Stavrinidou, P. Leleux, T. Herve, S. Sanaur, and G.G. Malliaras, "High speed and high density organic electrochemical transistor arrays", *Appl. Phys. Lett.* 99, 163304 (2011).
22. D. Khodagholy, T. Doublet, M. Gurfinkel, P. Quilichini, E. Ismailova, P. Leleux, T. Herve, S. Sanaur, C. Bernard, and G.G. Malliaras, "Highly conformable conducting polymer electrodes for in vivo recordings", *Adv. Mater.* 36, H268 (2011).

Proceedings of Refereed Conferences: (List in Chronological Order)

- C1.
- C2.

Books and Chapters in Books: (List in Chronological Order)

D. Khodagholy, G. G. Malliaras, R. M. Owens, "Polymer-based sensors", in *Comprehensive Polymer Science, 2nd Edition*, K. Matyjaszewski, M. Möller, vol. 8, Elsevier BV, Amsterdam (2012)

Other Major Publications:

- MP1.
- MP2.

Memoranda and Reports (from Committee Work):

Internal (Department, School, University)

External:

NAME Dion Khodagholy

Patents:

Spyropoulos G., Gelinis J, Khodagholy D.* , Ion gated transistors for integrated bioelectronics (pending)

Major New Products, Processes, Designs, or Systems:

NAME Dion Khodagholy

Research Funding History

(List in Chronological Order, If co-PI list your amount or portion of the award):

Funding Agency; Project Title;

PI Status and your role if multiple PI project:

Total funding period;

Total funding; Annual funding of project; Annual funding for your effort

NIH, Brain Initiative (U01NS108923)

Mechanisms of Rapid, Flexible Cognitive Control in Human Prefrontal Cortex

Co-investigator, 2 years

Administered by Baylor College of Medicine

Total: \$1,488,112, our portion \$208K

NAME Dion Khodagholy

Invited Lectures

(List in Chronological Order) – Plenary Lectures; Keynote Lectures; Invited Seminars at Universities, Companies, Agencies:

Date, Title, Location

Invited speaker, MRS Spring (Phoenix, USA) 2019

Invited lecture: Technical University of Munich (TUM), (Munich, Germany) Spring 2019

Invited lecture: Baylor College of Medicine, (Texas, USA) 2018

Invited speaker, MRS fall (Boston, USA) 2018

Invited lecture: Bioelectronics Winter School, (Tirol, Austria), 2018

Invited lecture: University of Linköping, Sweden, 2018

Invited speaker, MRS Spring (Phoenix, USA) 2018

Invited speaker, MRS Fall, (Boston, USA) 2017

Invited talk: SPIE17, (San Diego, USA) August 2017.

Invited talk: SPIE16, (San Diego, USA) August 2016.

Invited talk: SPIE15, (San Diego, USA) August 2015.

Invited talk: CMOSETR, (Vancouver, CA) May 2015.

Invited talk: Human single neuron conference, November 2014, John Hopkins, MA.

Invited lecture: École Polytechnique de Montréal, January 2012, Montreal, Canada.

Invited lecture: Linköping University, Sweden

NAME Dion Khodagholy

Service: Department, School, University

| Activity | Beginning | Ending |
|-------------------------------------|-----------|---------|
| MS advising committee | 2018 | Present |
| MS admission committee | 2019 | Present |
| MS student mentoring | 2018 | Present |
| Art of Engineering | 2018 | Present |
| Field work and internship committee | 2018 | Present |
| Undergraduate mentoring | 2018 | Present |
| Faculty meeting reporter | 2017 | resent |

Professional Services:

(Proposal Reviewing; Editorial Work; National Committee Work; Conference organization, etc)

Conference chair of MRS

Conference organizer and chair of Bioelectronics Winter School

Editor of Advanced Interface Materials

Current Professional Organization Membership:

Materials Research Society

Society of Neuroscience

Consulting Record:

| Firm | Beginning | Ending |
|------|-----------|--------|
|------|-----------|--------|

Professional Registration:

NAME Dion Khodagholy

Theses Supervised

Summary

| | <u>Total</u> | <u>Completed</u> | <u>In Progress</u> |
|-----------------|--------------|------------------|--------------------|
| B.S. | | | |
| M.S. | 1 | | |
| As Supervisor | 1 | 1 | |
| <u>Doctoral</u> | | | |
| As Supervisor: | 2 | | 2 |
| As Reader: | 4 | 1 | 3 |

B.S. Theses

Student Name, Thesis Title, Thesis Date

M.S. Theses

Doctoral Theses, Supervisor

Prawesh Dahal, Fall 2018-present

Claudia Cea, Spring 2018- presnt

Doctoral Theses, As Reader (On Thesis Committee):

Bahar Khalighinejad, EE, Thesis committee

Aida Colon, EE, Thesis committee (defended)

Caroline Yu, EE, Thesis committee

Zhewei Jiang, Thesis committee

Current Research Group (students and postdoctoral associates who are in progress):

Student, Thesis project placeholder title, period in your group (beginning date to present),
BS/MS/PhD

George Spyropoulos

Human Frontiers Post-doctoral fellow

Zifang Zhao

Postdoctoral research scientist

Prawesh Dahal

Graduate Student

Caludia Cea

Graduate Student

Patricia Jastrzebska-Perfect

Undergraduate Student

Johnny Chiahao Li

Undergraduate Student

Shilpika Chowdhury

Masters Student

Han Yu

Master Student

Onni Rauhala

Research assistant

NAME

Postdoctoral Associates

| <i>Name</i> | <i>Period of Stay</i> | <i>Current Position</i> |
|--------------------|-----------------------|--------------------------------------|
| George Spyropoulos | 2017-2020 | Human Frontiers Post-doctoral fellow |
| Zifang Zhao | 2019-2023 | Postdoctoral research scientist |

NAME

Teaching Experience

| Term | Subject Number | Title | Role (Lecturer, Laboratory, Recitation) |
|-------------|----------------|--|--|
| Spring 2018 | ELEN6945 | Device Nanofabrication | Lecturer |
| Fall 2018 | EEBME6091 | Tools and analysis for neural circuits | Lecturer |
| Fall 2018 | ENGIE1102 | Art of Engineering | Laboratory |
| Spring 2019 | ELEN6945 | Device Nanofabrication | Lecturer |
| Spring 2019 | ENGIE1102 | Art of Engineering | Laboratory |

Teaching Innovations

Indicate any teaching innovations if applicable such as architecting and offering a new course; new teaching methods for a course; new laboratory elements; new on-line elements

Two new courses have been developed.

A new hands-on nanoscience course has been proposed.

Developed a new project for EE portion of Art of Engineering.

Teaching Evaluations

(Include Term, number of students, course evaluation score, and instructor evaluation score)

NAME

Outreach Efforts

(General Public, Media, K-12, Under-Represented Groups)

High school student mentoring

Summer research program for under-represented minorities in biomedical engineering

Active collaboration with Harlem Maker Space for training high school teachers