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## Optogenetic investigation of cardiac arrhythmia mechanisms

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### Citation

Feola, I. (2018, December 11). *Optogenetic investigation of cardiac arrhythmia mechanisms*. Retrieved from <https://hdl.handle.net/1887/67391>

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**Author:** Feola, I.

**Title:** Optogenetic investigation of cardiac arrhythmia mechanisms

**Issue Date:** 2018-12-11

## LIST OF PUBLICATIONS

### Full papers

\*Equal contribution

Majumder R\*, **Feola I\***, Teplenin A, de Vries AAF, Panfilov AV, Pijnappels DA. Optogenetics enables real-time spatiotemporal control over spiral wave dynamics in an excitable cardiac system. *eLife*. 2018; 7pii: e41076.

**Feola I**, Volkens L, Majumder R, Teplenin A, Schalij MJ, Panfilov AV, de Vries AAF, Pijnappels DA. Localized Optogenetic Targeting of Rotors in Atrial Cardiomyocyte Monolayers. *Circ Arrhythm Electrophysiol*. 2017; 10pii: e005591.

Watanabe M\*, **Feola I\***, Majumder R, Jangsongthong W, Teplenin AS, Ypey DL, Schalij MJ, Zeppenfeld K, de Vries AA, Pijnappels DA. Optogenetic manipulation of anatomical reentry by light-guided generation of a reversible local conduction block. *Cardiovasc Res*. 2017; 113:354-366.

**Feola I**, Teplenin A, de Vries AA, Pijnappels DA. Optogenetic Engineering of Atrial Cardiomyocytes. *Methods Mol Biol*. 2016; 1408:319-31.

Majumder R, Jangsongthong W, **Feola I**, Ypey DL, Pijnappels DA, Panfilov AV. A Mathematical Model of Neonatal Rat Atrial Monolayers with Constitutively Active Acetylcholine-Mediated K<sup>+</sup> Current. *PLoS Comput Biol*. 2016; 12:e1004946.

Bingen BO, Engels MC, Schalij MJ, Jangsongthong W, Neshati Z, **Feola I**, Ypey DL, Askar SF, Panfilov AV, Pijnappels DA, de Vries AA. Light-induced termination of spiral wave arrhythmias by optogenetic engineering of atrial cardiomyocytes. *Cardiovascular Res*. 2014; 104:194-205.

Engels MC, Askar SF, Jangsongthong W, Bingen BO, **Feola I**, Liu J, Majumder R, Versteegh MI, Braun J, Klautz RJ, Ypey DL, De Vries AA, Pijnappels DA. Forced fusion of human ventricular scar cells with cardiomyocytes suppresses arrhythmogenicity in a co-culture model. *Cardiovascular Res*. 2015; 107:601-612.

Bingen BO, Askar SF, Neshati Z, **Feola I**, Panfilov AV, de Vries AA, Pijnappels DA. Constitutively active acetylcholine-dependent potassium current increases atrial defibrillation threshold by favoring post-shock re-initiation. *Sci Rep*. 2015; 5:15187.

Letters

**Feola I**, Volkens L, Majumder R, Teplenin A, SchaliJ MJ, Panfilov AV, de Vries AAF, Pijnappels DA. Response by Feola et al to Letter Regarding Article, “Localized Optogenetic Targeting of Rotors in Atrial Cardiomyocyte Monolayers”. *Circ Arrhythm Electrophysiol.* 2018; 11:e006130.

Presented abstracts (Selection)

**Feola I**, Watanabe M, Teplenin AS, SchaliJ MJ, Zeppenfeld K, Ypey DL, de Vries AAF, Pijnappels DA. Local light exposure terminates anatomical reentry in optogenetically modified transverse rat ventricular tissue slices. Oral presentation during Young Investigator Award at *Rembrandt Symposium 2015*.

Jangsangthong W, **Feola I**, Teplenin AS, SchaliJ MJ, de Vries AAF, Pijnappels DA. Microfoci of oxidative stress increase pro-arrhythmic risk as revealed by patterned illumination of optogenetically engineered myocardial cultures. Poster presentation at *HRS Conference 2016*.

**Feola I**, Watanabe M, Teplenin AS, SchaliJ MJ, Zeppenfeld K, Ypey DL, de Vries AAF and Pijnappels DA. Optogenetic termination of anatomical reentry in rat myocardial slices. Oral presentation at *EHRA EUROPACE – CARDIOSTIM 2017*.

**Feola I**, Volkens L, Majumder R, de Vries AAF, Pijnappels DA. Optogenetic ablation of spiral wave arrhythmias by creating light lesions. Oral presentation during Young Investigator Award at *EHRA EUROPACE – CARDIOSTIM 2017*.

**Feola I**, Majumder R, de Vries AAF, Panfilov AV, Pijnappels DA. Optogenetic manipulation of atrial spiral wave trajectory in space and time: capture, drag and terminate. Poster presentation at *HRS Conference 2018*.

## ACKNOWLEDGMENTS

In my journey towards this dissertation, many people have contributed to my personal and scientific development. First, I would like to express my gratitude to my supervisors, Prof. Schaliĳ, Daniël and Twan, since without their support I would not have been able to conclude this chapter of my life. Twan, thank you for your scientific input and guidance. Daniël, thank you for believing in me, for your support and for always challenging me. Sometimes it has not been easy to cope with the pressure, but this experience has shaped me into who I am today.

My special thanks go to Minka, Cindy, Margreet, Zeinab, Jia, Arti, Marc, Yoke, Masaya, Sasha, Annemarie, Rupa, Emile, Linda, Niels, Pim, Magda, Sven, and Juan. They have supported me when things were not going as planned and celebrated with me the happy moments. Thank you, guys! Minka, thank you for your availability in solving each and every problem. Cindy and Annemarie, thank you for helping with cloning, viral vector production and isolation of cardiomyocytes. Margreet, thanks for your advice and for performing the best western blot with anti-GFP antibody. Zeinab and Prof. Ypey, thank you for your time in teaching and explaining. Jia, thank you for sharing every step of this journey. Arti, thank you for your wise scientific advice. Yoke, thank you for the time spent together in and outside the “dark room”, where your company and the good music made everything easier. Masaya, thank you for your kindness, your time and dedication. Sasha and Rupa, thank you for the great collaboration, it has been a pleasure to discuss scientific matters with you. Linda, thank you for your scientific support by performing patch-clamp experiments. Niels, Emile, and Pim, as very typical Dutch people, you are very direct. Initially, I thought that was a bit rude, and maybe sometimes it is, but sometimes it is also necessary. Thank you for showing that to me. Pim, thank you for helping with the Dutch translation of the summary. Magda, I hoped I had met you before. Thank you for your amazing support in this last period. Juan and Sven, it was a pleasure and fun to share the office with you. Magda and Sasha, finally, thank you for accepting to be my paranims.

Furthermore, I would like to thank Harald for giving me the possibility to come to his laboratory during my master, and Selina for teaching me everything I know about working in a laboratory. Thanks also to Saïd and Brian for their initial input on cardiac electrophysiology.

Valeria, Luca, Nicoletta, and Bob thank you for your friendship, the dinners, the parties and all the moments that we have shared together. The Netherlands has been a better place with you in our life. Thank you also for making me aunty of Thomas and Elisa.

Thanks to my family, family-in-law and all my far-away friends. Your funny messages and your happy news (weddings and babies) have always given me a reason to smile. Special thanks go to the 'Italia-IOlanda', the 'Castelnuovo's club', the 'poli e dintorni' and the 'NL-CH' groups. Irma, thank you for accepting the important task of finalizing the cover of this thesis, that was a special gift. Gloria, we had different experiences but we shared the same emotions. Thank

## Acknowledgments

you for showing to me how important it is to follow your dreams. Ala, you are one of the most wonderful creatures I have ever met. Thank you for your unconditional support.

Andrew, you are my special Aussie cousin. Thank you for your love. Your words have always encouraged me. Thanks aunt Lucia and uncle Franco, your availability and your constant presence in mum's life have made me less worried.

Francesco, often I think that maybe your life would have been different if you would have left and I would have stayed. We will never know that, but I hope, with all my heart, you will find your happy dimension. Thank you for supporting my choices.

Mum, it is very difficult to express with words my gratitude to you. You have made so many sacrifices for our happiness. Thank you for being such an inspiring example!

Guido, you are my home, my soul mate. Your support has been really important in this journey. After a bad day, I was often not easy going, but you tried and tried again until I started to smile again. Thank you for being there. Those last 2 years have been even more challenging for us. May the future gift us with the possibility to share more time together, full of adventures and experiences that will make us happy.

Finally, I would like to thank the little warrior that is inside me for never letting me give up.

## CURRICULUM VITAE

Iolanda Feola was born on May 20<sup>th</sup>, 1987 in Vallo della Lucania, Italy. After finishing high school in 2006 she left her little town and moved to Parma where she started her academic journey. She obtained her bachelor's degree in Biotechnology in 2009. Three years later she obtained her master's degree in Medical, Veterinary and Pharmaceutical Biotechnology. During her bachelor, she performed her first internship at the Department of Neuroscience, at University of Parma, under the guidance of prof. R. Tirindelli and dr. L. Silvotti. During her master, she won the Erasmus scholarship that allowed her to move to The Netherlands. There, she spent her six-month internship at the Department of Molecular and Cell Biology at Leiden University Medical Center under the supervision of dr. H. Mikkers and S. Van Leeuwen. In 2013, she started her PhD training in the laboratory of experimental cardiology, Department of Cardiology, under the supervision of prof. dr. M.J. Schalij, dr. D.A. Pijnappels and dr. A.A.F. de Vries. During her training, she investigated the underlying mechanisms of cardiac arrhythmias by using optogenetics to precisely control, in time and space, the electrical properties of cardiac cells. The work performed during her training is presented in this thesis.

## AWARDS

- 2017 Diploma in recognition of the best original work. EHRA  
Europace-Cardiostim Conference.
- 2017 Runner-up during the Young Investigator Award competition. EHRA Europace-Cardiostim Conference.
- 2015 Best Oral Presentation Award. Rembrandt Conference of Cardiovascular Science.
- 2010 Erasmus scholarship from the University of Parma to perform an internship abroad.