Gerard A. Marchal, PhD

Date of birth:
08 February 1991
Nationality:
Dutch (The Netherlands)

Contact information:

Address:
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Phone:
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E-mail:
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ORCiD:
0000-0002-7353-0235

Main skills:

- Whole-heart optical mapping
- Single-cell electrophysiology
- Histological analyses
- Animal research

Languages:

English:
Proficient user

Dutch:
Native language

Italian:
Independent user

Research activity:

2023-2025:
Marie Skłodowska-Curie Actions Postdoctoral Research Fellow
OptoCARD Lab, Institute of Clinical Physiology (CNR-IFC), Florence, Italy
Research Director: Leonardo Sacconi, PhD

2021-2023:
Postdoctoral Research Fellow (Assegno di Ricerca)
Cardiac Imaging Group, National Institute of Optics (CNR-INO) and European Laboratory for Non-Linear Spectroscopy (LENS), Florence, Italy
Principal Investigator: Leonardo Sacconi, PhD

Education:

2015-2022:
Doctoral (PhD) Research Programme
University of Amsterdam, Amsterdam, Netherlands
Faculty of Medicine, Department of Experimental Cardiology
Thesis title: *Charting Novel Aspects of the Cardiac Sodium Channel*
Promotor: C.A. Remme MD, PhD
Co-promoters: V. Portero, PhD; S. Casini, PhD
PhD degree awarded: 21-04-2022

2013-2015:
Master of Science (MSc) programme,
Cardiovascular Research
VU University, Amsterdam, The Netherlands

2008-2013:
Bachelor of Applied Sciences (B AS) programme,
Biology & Medical Laboratory Research
HU University of Applied Sciences, Utrecht, The Netherlands
Specialisation: Zoology

Certificates:

Laboratory Animal Science (Article 9, 13f.2 certified, Dutch Experiments on Animals Act)

IBM Professional Certificate in Data Science

Relevant work experience:

July 2014 - November 2014:
Department of Experimental Cardiology, Academic Medical Centre of the University of Amsterdam, Amsterdam, The Netherlands
Role: Research technician (*ex vivo* functional experiments on murine hearts)
Principal Investigator: C.A. Remme, MD, PhD

January 2013 - August 2013:
Department of Experimental Cardiology, University Medical Centre of the Utrecht University, Utrecht, The Netherlands
Role: Bio-technician (support for *in vivo* experiments in a porcine model)
Principal Investigator: prof. G. Pasterkamp, MD, PhD

Research internships:

Master of Science (MSc), Cardiovascular Research:

December 2014 - July 2015:
Division of Cardiovascular Medicine, University of Oxford, United Kingdom
Research subject: *The role of myocardial oxidative stress in the development of atrial fibrillation*
Supervisor: prof. B. Casadei, MD, DPhil

September 2014 - November 2014:
Department of Cardiology, Academic Medical Centre, Amsterdam, Netherlands
Literature study subject: *Effect of digoxin on mortality in patients with atrial fibrillation in the absence or presence of heart failure*
Supervisor: J.R. de Groot, MD, PhD

March 2014 - July 2014:
Department of Experimental Cardiology, Academic Medical Centre, Amsterdam, Netherlands
Research subject: *Impact of the cardiac sodium channel $Na_V1.5$ on murine embryonic cardiac development and function*
Supervisor: C.A. Remme, MD, PhD

Bachelor of Applied Sciences (B AS), Biology & Medical Laboratory Research:

April 2012 - January 2013:
Department of Experimental Cardiology, Academic Medical Centre, Amsterdam, Netherlands
Research subject: *Electrophysiological effects of chronic ranolazine treatment in Scn5a-1798insD$^{+/-}$ transgenic mice*
Supervisor: C.A. Remme, MD, PhD

November 2011 - March 2012:
Department of Experimental Cardiology, University Medical Centre, Utrecht, Netherlands
Research subject: *Usability and safety of coronary infused cell beads after myocardial ischemia in a porcine model*
Supervisors: M. Jansen, B AS and R. de Jong, MD, PhD

Publications in peer-reviewed journals:

Papers in peer-reviewed journals: 19, of which 10 as (shared) first author
Total citations: 361, h-index: 12 (as assessed by Google Scholar in June 2025)

***Marchal GA**, Rivaud MR, Wolswinkel R, Basso C, van Veen TAB, Bezzina CR, and Remme CA*
Genetic background determines the severity of age-dependent cardiac structural abnormalities and arrhythmia susceptibility in Scn5a-1798insD mice
Europace. **2024** Jun 3;26(6):euae153. doi: 10.1093/europace/euae153.

*Nasilli G, de Waal TM, **Marchal GA**, Bertoli G, Veldkamp MW, Rothenberg E, Casini S, and Remme CA*
Decreasing microtubule detyrosination modulates $Na_V1.5$ subcellular distribution and restores sodium current in mdx cardiomyocytes
Cardiovasc Res. **2024** May 29;120(7):723-734. doi: 10.1093/cvr/cvae043.

***Marchal GA**, Biasci V, Yan P, Palandri C, Campione M, Cerbai E, Loew LM, and Sacconi L*
Recent advances and current limitations of available technology to optically manipulate and observe cardiac electrophysiology
Pflugers Arch - Eur J Physiol. **2023** Nov;475(11):1357-1366. doi: 10.1007/s00424-023-02858-0.

***Marchal GA**,* Biasci V,* Loew LM, Biggeri A, Campione M, and Sacconi L*
Optogenetic manipulation of cardiac repolarization gradients using sub-threshold illumination
Front Physiol. **2023** May 5;14:1167524. doi: 10.3389/fphys.2023.1167524.

***Marchal GA**, Galjart N, Portero V, and Remme CA*
Microtubule plus-end tracking proteins: novel modulators of cardiac sodium channels and arrhythmogenesis
Cardiovasc Res. **2023** Jul 4;119(7):1461-1479. doi: 10.1093/cvr/cvad052.

Tsui H., van Kampen SJ*, Han SJ, Meraviglia V, Ham WB, Casini S, van der Kraak P, Vink A, Yin X, Mayr M, Bossu A, **Marchal GA**, Monshouwer-Kloots J, Eding J, Versteeg D, de Ruiter H, Bezstarosti K, Groeneweg J, Klaasen SJ, van Laake LW, Demmers JAA, Kops GJPL, Mummery CL, van Veen TAB, Remme CA, Bellin M, and van Rooij E*
Desmosomal protein degradation as an underlying cause of arrhythmogenic cardiomyopathy
Sci Transl Med. **2023** Mar 22;15(688):eadd4248. doi: 10.1126/scitranslmed.add4248.

Casini S, **Marchal GA**,* Kawasaki M, Fabrizi B, Wesselink R, Nariswari F, Neefs J, van den Berg NWE, Driessen AHG, de Groot JR, Verkerk AO, and Remme CA*
Differential sodium current remodeling identifies distinct cellular pro-arrhythmic mechanisms in paroxysmal versus persistent atrial fibrillation
Can J Cardiol. **2023** Mar;39(3):277-288.doi: 10.1016/j.cjca.2022.12.023.

***Marchal GA** and Remme CA*
Subcellular diversity of $Na_V1.5$ in cardiomyocytes: distinct functions, mechanisms and targets
J Physiol. **2023** Mar;601(5):941-960. doi: 10.1113/JP283086.

*Biasci V, Santini L, **Marchal GA**, Hussaini S, Ferrantini C, Coppini R, Loew LM, Luther S, Campione M, Poggesi C, Pavone FS, Cerbai E, Bub G, and Sacconi L*
Optogenetic manipulation of cardiac electrical dynamics using sub-threshold illumination: Dissecting the role of cardiac alternans in terminating rapid rhythms
Basic Res Cardiol. **2022** Apr 29;117(1):25. doi: 10.1007/s00395-022-00933-8.

Portero V, Nicol T,* Podliesna S,* **Marchal GA**, Baartscheer A, Casini S, Tadros R, Treur JL, Tanck MWT, Cox IJ, Probert F, Hough TA, Falcone S, Beekman L, Müller-Nurasyid M, Kastenmüller G, Gieger C, Peters A, Kääb S, Sinner MF, Blease A, Verkerk AO, Bezzina CR, Potter PK, and Remme CA*

Chronically elevated branched chain amino acid levels are pro-arrhythmic

Cardiovasc Res. **2021** Jun 22;118(7):1742-1757. doi: 10.1093/cvr/cvab207.

***Marchal GA**,* Jouni M,* Chiang DY,* Pérez-Hernández M,* Podliesna S, Yu N, Casini S, Potet F, Veerman CC, Klerk M, Lodder EM, Mengarelli I, Guan K, Vanoye CG, Rothenberg E, Charpentier F, Redon R, George AL Jr, Verkerk AO, Bezzina CR, MacRae CA, Burridge PW, Delmar M, Galjart N, Portero V,* and Remme CA**

Targeting the microtubule EB1-CLASP2 complex modulates $Na_V1.5$ at intercalated discs

Circ Res. **2021** Jul 23;129(3):349-365. doi: 10.1161/CIRCRESAHA.120.318643.

***Marchal GA**, van Putten M, Verkerk AO, Casini S, Putker K, van Amersfoorth SCM, Aartsma-Rus A, Lodder EM, and Remme CA*

Low human dystrophin levels prevent cardiac electrophysiological and structural remodelling in a duchenne mouse model

Sci Rep. **2021** May 7;11(1):9779. doi: 10.1038/s41598-021-89208-1.

Verkerk AO, **Marchal GA**,* Zegers JG, Kawasaki M, Driessen AHG, Remme CA, de Groot JR, and Wilders R*

Patch-clamp recordings of action potentials from human atrial myocytes: Optimization through dynamic clamp

Front Pharmacol. **2021** Apr 12;12:649414. doi: 10.3389/fphar.2021.649414.

*Simon JN, Vrellaku B, Monterisi S, Chu SM, Rawlings N, Lomas O, **Marchal GA**, Waithe D, Syeda F, Gajendragadkar PR, Jayaram R, Sayeed R, Channon KM, Fabritz L, Swietach P, Zaccolo M, Eaton P, and Casadei B*

Oxidation of protein kinase A regulatory subunit PKARIα protects against myocardial ischemia-reperfusion injury by inhibiting lysosomal-triggered calcium release

Circulation. **2021** Feb 2;143(5):449-465. doi: 10.1161/CIRCULATIONAHA.120.046761.

*Rivaud MR, **Marchal GA**, Wolswinkel R, Jansen JA, van der Made I, Beekman L, Ruiz-Villalba A, Baartscheer A, Rajamani S, Belardinelli L, van Veen TAB, Basso C, Thiene G, Creemers EE, Bezzina CR, and Remme CA*

Functional modulation of atrio-ventricular conduction by enhanced late sodium current and calcium-dependent mechanisms in *Scn5a*$^{1798insD/+}$ mice

Europace. **2020** Oct 1;22(10):1579-1589. doi: 10.1093/europace/euaa127.

***Marchal GA**, Verkerk AO, Mohan RA, Wolswinkel R, Boukens BJD, and Remme CA*

The sodium channel $Na_V1.5$ impacts on early murine embryonic cardiac development, structure and function in a non-electrogenic manner

Acta Physiol (Oxf). **2020** Oct;230(2):e13493. doi: 10.1111/apha.13493.

*Casini S, **Marchal GA**, Kawasaki M, Nariswari FA, Portero V, Van Den Berg NWE, Guan, K, Driessen AHG, Veldkamp MW, Mengarelli I, De Groot, JR, Verkerk AO, and Remme CA*

Absence of functional $Na_V1.8$ channels in non-diseased atrial and ventricular cardiomyocytes

Cardiovasc Drugs Ther. **2019** Dec;33(6):649-660 doi: 10.1007/s10557-019-06925-6.

Casini S, Albesa M,* Wang Z, Portero V, Ross-Kaschitza D, Rougier JS, **Marchal GA**, Chung WK, Bezzina CR, Abriel,* and Remme CA**

Functional consequences of the *SCN5A*-p.Y1977N mutation within the PY ubiquitylation motif: discrepancy between HEK293 cells and transgenic mice.

Int J Mol Sci. **2019** Oct 11;20(20):E5033. doi: 10.3390/ijms20205033.

Rivaud MR, Jansen JA,* Postema PG,* Nannenberg EA, Mizusawa Y, van der Nagel R, Wolswinkel R, van der Made I,* ***Marchal GA****, Rajamani S, Belardinelli L, van Tintelen JP, Tanck MWT, van der Wal AC, de Bakker JMT, van Rijen HV, Creemers EE, Wilde AAM, van den Berg MP, van Veen TAB, Bezzina CR, and Remme CA*

A common co-morbidity modulates disease expression and treatment efficacy in inherited cardiac sodium channelopathy.

Eur Heart J. **2018** Aug 14;39(31):2898-2907. doi: 10.1093/eurheartj/ehy247.

* denotes shared first/last authorship

Presentations at scientific conferences:

Total oral presentations: 4, poster presentations: 20, awards: 1

2024:

38th Meeting of the European Section of the ISHR, Toulouse, France

Oral presentation: Morpho-functional correlation reveals frequency dependence of trans-scar action potential propagation in arrhythmogenic mouse hearts

48th EWGCCE Meeting, Graz, Austria

Poster presentation: Novel Advanced Optical Approaches to Measure and Manipulate Cardiac Dynamics

2023:

Symposium on Novel Optical Technology in Cardiac Electrophysiology (NOTiCE), Glasgow, UK

Poster presentation: Optogenetic manipulation of cardiac repolarization gradients using sub-threshold illumination

47th EWGCCE Meeting, Copenhagen, Denmark

Poster presentation: Optogenetic manipulation of cardiac repolarization gradients using sub-threshold illumination

2022:

Florence Heart Day, Florence, Italy

Poster presentation: Generating repolarisation heterogeneities to promote and understand arrhythmias

2019:

10th Rembrandt Symposium, Noordwijkerhout, Netherlands

Oral presentation: Targeting the microtubule plus-end tracking EB1-CLASP2 protein complex modulates $Na_V1.5$ specifically at the intercalated disc

Gordon Research Conference, Cardiac Arrhythmia Mechanisms, Lucca, Italy

Poster presentation: Targeting the microtubule plus-end tracking EB1-CLASP2 protein complex modulates $Na_V1.5$ specifically at the intercalated disc

Gordon Research Conference, Cardiac Arrhythmia Mechanisms, Lucca, Italy

Oral presentation: Targeting the microtubule plus-end tracking EB1-CLASP2 protein complex modulates $Na_V1.5$ specifically at the intercalated disc

40th Heart Rhythm Society: Scientific Sessions, San Fransisco, CA, USA

Poster presentation: Targeting the microtubule plus-end tracking EB1-CLASP2 protein complex modulates $Na_V1.5$ specifically at the intercalated disc

43rd EWGCCE Meeting, Lisbon, Portugal

Oral presentation: Microdomain-specific regulation of sodium current by targeting the microtubule plus-end tracking protein complex

Parameters of Esteem: Travel grant

2018:

4th Amsterdam Cardiovascular Sciences: annual meeting, Amsterdam, Netherlands

Poster presentation: Microtubule plus-end tracking protein complex: a novel pharmacological target for modulating $Na_V1.5$ trafficking and function

Frontiers in CardioVascular Biology, Vienna, Austria

Poster presentation: Microtubule plus-end tracking protein complex: a novel pharmacological target for modulating $Na_V1.5$ trafficking and function

Channelopathy Meeting, Chicago, IL, USA

Poster presentation: The microtubule plus-end tracking protein complex: a novel target to restore cardiac conduction

42nd EWGCCE meeting, Essen, Germany

Poster presentation: Late sodium current density increases during the progression from paroxysmal to persistent human atrial fibrillation

9th Rembrandt Symposium, Noordwijkerhout, Netherlands

Poster presentation: Late sodium current density increases during the progression from paroxysmal to persistent human atrial fibrillation

2017:

3rd Amsterdam Cardiovascular Sciences: annual meeting, Amsterdam, Netherlands

Poster presentation: Trafficking and function of the cardiac sodium channel $Na_V1.5$ -role of the microtubule network and impact of GSK3β inhibition-

8th Rembrandt Symposium, Noordwijkerhout, Netherlands

Poster presentation: Trafficking and function of the cardiac sodium channel $Na_V1.5$ -role of the microtubule network and impact of GSK3β inhibition-

41st EWGCCE meeting, Vienna, Austria

Poster presentation: Pharmacological GSK3 inhibition modulates $Na_V1.5$ function

2016:

2nd Amsterdam Cardiovascular Sciences: annual meeting, Amsterdam, Netherlands

Poster presentation: Sodium channel expression, distribution and (dys)function in atrial myocytes: relevance for arrhythmogenesis

40th EWGCCE meeting, Glasgow, UK

Poster presentation: Sodium channel expression, distribution and (dys)function in atrial myocytes

7th Rembrandt Symposium, Noordwijkerhout, Netherlands

Poster presentation: Sodium channel expression, distribution and (dys)function in atrial myocytes

2015:

1st Amsterdam Cardiovascular Sciences: annual meeting, Amsterdam, Netherlands

Poster presentation: Electrical and structural abnormalities in homozygous Scn5a-1798insD mutant embryos

2014:

5th Rembrandt Symposium, Noordwijkerhout, Netherlands

Poster presentation: Electrical and structural abnormalities in homozygous Scn5a-1798insD mutant embryos

38th EWGCCE meeting, Maastricht, Netherlands

Poster presentation: Electrical and structural abnormalities in homozygous Scn5a-1798insD mutant embryos