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## BIOGRAPHICAL SKETCH

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NAME: **Myriam Amsallem, MD**

eRA COMMONS USER NAME : myriam.amsallem

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POSITION TITLE: **Postdoctoral Researcher**

### EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Lyon I University, France	M.D.	2006-2011	Medicine
Paris VII University, France	Fellowship	2011-2014	Cardiovascular Medicine
Stanford University, Stanford	Postdoctorate fellowship	2014-2015	Vascular Inflammation Imaging
Paris VII University, France	M.S.	2016	Vascular Biology
Marie Lannelongue Hospital, France	Advanced clinical fellowship	2016-2017	Pulmonary Hypertension and Right Heart Failure
Stanford University, Stanford	Postdoctorate fellowship	2017-	Cardiovascular Imaging – PH and Heart Failure

### A. Personal Statement

My long term research interests involve computational methods to develop algorithms for early detection of pulmonary hypertension and right heart failure as well as the development of novel imaging technology (such as 4-dimensional blood flow magnetic resonance imaging) for right heart-pulmonary axis.

My clinical training in cardiovascular disease in Paris and advanced clinical fellowship in imaging at Marie Lannelongue Hospital (France) have contributed to building a focus and clinically relevant expertise in 2D and 3D cardiovascular imaging. My first research experience at Stanford in Cardiovascular Medicine under supervision of Michael V. McConnell MD MSEE enabled me to strengthen my expertise in Imaging of Vascular Biology. My further academic training and research experience at Stanford under the supervision of my co-mentors Roham Zamanian MD and Francois Haddad MD at Stanford and Prof. Elie Fadel at Marie Lannelongue Hospital (France) have also provided me with an excellent background in right heart imaging, pulmonary hypertension and cardioimmunology. I am also collaborating on several studies exploring Omics of right heart adaptation at Stanford (with Andrew Sweat MD and Roham Zamanian MD as part of my 2016 Young Investigator Seed Grant from the Vera Moulton Wall Center on Immunity of Right Heart Failure in PAH) and with Marie Lannelongue Hospital (with Marc Humbert MD PhD and Elie Fadel MD PhD as part of their RHU grant on Metabolomics

and Proteomics of Reverse Right Heart Remodeling in patients with CTEPH after endarterectomy and PAH after double lung transplantation). My future career goal is to be an academic cardiologist (clinical educator) focusing on Right Heart Failure and Pulmonary Vascular Disease with Imaging and Biomarker expertise. My goal is a logical extension of my work within our team on focusing on improving early detection of PH and detection of right heart failure using novel imaging techniques.

1. Amsallem M, Sweatt AJ, Aymami MC, Kuznetsova T, Selej M, Lu H, Mercier O, Fadel E, Schnittger I, McConnell MV, Rabinovitch M, Zamanian RT, Haddad F. Right Heart End-Systolic Remodeling Index Strongly Predicts Outcomes in Pulmonary Arterial Hypertension: Comparison With Validated Models. *Circ Cardiovasc Imaging* 2017 10.pii:e005771
2. Haddad F, Amsallem M (co-first), Kobayashi Y, Moneghetti K, Mercier O. In Defense of the Right Ventricle, An Argument Fifty Years in the Making. *J Am Coll Cardiol HF* 2017 (State of the Art - in revisions).
3. Haddad F, Amsallem M. Full Circle on Pulmonary Flow Dynamics in Pulmonary Arterial Hypertension. *J Am Coll Cardiol Img* 2017 (Epub).
4. Amsallem M, Boulate D, Aymami M, Guihaire J, Selej M, Huo J, Denault AY, McConnell MV, Schnittger I, Fadel E, Mercier O, Zamanian RT, Haddad F. Load Adaptability in Patients With Pulmonary Arterial Hypertension. *Am J Cardiol* 2017;120:874-882.
5. Amsallem M, Guihaire J, Arthur Ataam J, Lamrani L, Boulate D, Mussot S, Fabre D, Taniguchi Y, Haddad F, Sitbon O, Jais X, Humbert M, Simonneau G, Mercier O, Brenot P, Fadel E. Impact of the Initiation of Balloon Pulmonary Angioplasty Program on Referral of Patients with Chronic Thromboembolic Pulmonary Hypertension to Surgery. *J Heart Lung Transplant* 2017 (under review).
6. Amsallem M, Boulate D, Kooreman Z, Zamanian RT, Fadel G, Schnittger I, Fadel E, McConnell MV, Dhillon G, Mercier O, Haddad F. Investigating the value of right heart echocardiographic metrics for detection of pulmonary hypertension in patients with advanced lung disease. *Int J Cardiovasc Imaging* 2017;33:825-835.
7. Amsallem M, Sternbach JM, Adigopula S, Kobayashi Y, Vu TA, Zamanian R, Liang D, Dhillon G, Schnittger I, McConnell MV, Haddad F. Addressing the Controversy of Estimating Pulmonary Arterial Pressure by Echocardiography. *J Am Soc Echocardiogr* 2016;29:93-102.
8. Amsallem M, Saito T, Tada Y, Dash R, McConnell MV. Magnetic Resonance Imaging and Positron Emission Tomography Approaches to Imaging Vascular and Cardiac Inflammation. *Circ J* 2016;80:1269-77.

## **B. Positions and Honors**

### **Positions and Employment**

2011 - 2014	Fellow in Cardiovascular Medicine, Paris, France
2014 - 2015	Postdoctoral Researcher, Stanford University
2016 - 2017	Advanced Cardiovascular Imaging Fellow, Marie Lannelongue Hospital, France
2017 -	Postdoctoral Researcher, Stanford University

## Honors

2011	Ranked in the top 10 (/7766) at the 2011 National Ranking Examination, France
2014	Highest honors (Silver decoration) for Medical Doctorate Thesis, France
2014	Paul Chiche Award for Best MD Thesis (Societe Francaise de Cardiologie)
2015	Best of Class of 2015 of Cardiology Residents and Fellows in Paris (France)
2016	American Heart Association Cournand and Comroe Young Investigator Award (Finalist)

## C. Contribution to Science

**1. Right ventricular physiology and imaging:** I have ongoing research focused in the field of right ventricular physiology. Research in the last two decades have highlighted the importance of right ventricular physiology in heart failure, coronary artery disease, pulmonary hypertension and advanced lung disease. During my advanced research fellowship training I was trained by one of the reference in the field (Francois Haddad) and published reviews and studies on the topic. My current research focuses on multimodality imaging of the right heart, outcomes research incorporating the right heart and on developing computational methods to early detection right heart failure and PH.

Representative publications:

- a. **Amsallem M**, Sternbach JM, Adigopula S, Kobayashi Y, Vu TA, Zamanian R, Liang D, Dhillon G, Schnittger I, McConnell MV, Haddad F. Addressing the Controversy of Estimating Pulmonary Arterial Pressure by Echocardiography. *J Am Soc Echocardiogr* 2016;29:93-102.
- b. **Amsallem M**, Kuznetsova T, Hanneman K, Denault A, Haddad F. Right Heart Imaging in Heart Failure: a Tale of Two Ventricles. *Curr Opin Cardiol* 2016;31:469-82.
- c. **Amsallem M**, Tuzovic M, Adigopula S, Kobayashi Y, Kadoch M, Boulate D, Krishnan G, Liang D, Schnittger I, Fleischmann D, McConnell MV, Haddad F. Regional right ventricular dysfunction in acute pulmonary embolism: relationship with clot burden and biomarker profile. *Int J Cardiovasc Imaging* 2016;32:389-98.
- d. **Amsallem M**, Boulate D, Kooreman Z, Zamanian RT, Fadel G, Schnittger I, Fadel E, McConnell MV, Dhillon G, Mercier O, Haddad F. Investigating the value of right heart echocardiographic metrics for detection of pulmonary hypertension in patients with advanced lung disease. *Int J Cardiovasc Imaging* 2017;33:825-835.
- e. Boulate D, Arthur Ataam J, Connolly AJ, Giraldeau G, **Amsallem M**, Decante B, Lamrani L, Fadel E, Dorfmueller P, Perros F, Haddad F, Mercier O. Early Development of Right Ventricular Ischemic Lesions in a Novel Large Animal Model of Acute Right Heart Failure in Chronic Thromboembolic Pulmonary Hypertension. *J Card Fail* 2017 Aug 8. pii: S1071-9164(17)31122-3
- f. Haddad F, **Amsallem M** (co-first), Kobayashi Y, Moneghetti K, Mercier O. In Defense of the Right Ventricle, An Argument Fifty Years in the Making. *J Am Coll Cardiol Heart Failure* 2017 (State of the Art).

**2. Ventricular adaptation and outcomes in pulmonary hypertension:** I have ongoing research focused in the field of ventricular adaptation, outcomes and pulmonary hypertension. Ventricular function and adaptation to overload state are key determinants of survival in patients with heart failure and PH. Over the last 3 years, I have been focusing on understanding the determinants of ventricular function in patients with pressure overload states. Ultimately, my

contribution to this research effort will be to identify key biomarkers of ventricular adaptation that will be useful for clinical care.

Representative publications:

- a. **Amsallem M**, Sweatt AJ, Aymami MC, Kuznetsova T, Selej M, Lu H, Mercier O, Fadel E, Schnittger I, McConnell MV, Rabinovitch M, Zamanian RT, Haddad F. Right Heart End-Systolic Remodeling Index Strongly Predicts Outcomes in Pulmonary Arterial Hypertension: Comparison With Validated Models. *Circ Cardiovasc Imaging* 2017 10.pii:e005771
- b. **Amsallem M**, Boulate D, Aymami M, Guihaire J, Selej M, Huo J, Denault AY, McConnell MV, Schnittger I, Fadel E, Mercier O, Zamanian RT, Haddad F. Load Adaptability in Patients With Pulmonary Arterial Hypertension. *Am J Cardiol.* 2017 Sep 1;120(5):874-882.
- c. **Amsallem M**, Aymami M (co-first), Haddad F, Moneghetti K, Adams J, Sallam K, Teuteberg J, Verhoye J-P, Wheeler M, Woo J, Ha R-T, Banerjee D. Right Ventricular Adaptation Phenotypes and Prediction of Right Heart Failure following Continuous-flow Left Ventricular Assist Device Implantation. 2017 (in submission).

**3. Cardio-immunology:** I have ongoing research focused in the field of cardio-immunology. As a cardiovascular imaging specialist, I have been working in the field of clinical immunology for the last 5 years. During my clinical cardiovascular residency and fellowship in Paris, I have first worked on the role of inflammation in response to antiplatelet therapy in patients with atherosclerosis disease. When I joined Michael V. McConnell MD MSEE's lab at Stanford Cardiovascular Medicine Division in 2014, I have worked on translational studies MR and PET Imaging of Vascular and Cardiac Inflammation. Within Stanford Cardiovascular Biomarker and Phenotypic Core Laboratory and with the support of the Vera Moulton Wall Center for Pulmonary Vascular Disease I am currently contributing to provide RV phenotyping for immune and proteomics studies on Right Heart Adaptation in PAH (with Andrew Sweat MD and Roham Zamanian MD). I am also collaborating with the French PH research group (Marc Humbert MD PhD, Elie Fadel MD PhD and Olaf Mercier MD PhD) on two prospective studies on metabolomics and immunity of right heart reverse remodeling after endarterectomy in patients with chronic thrombo-embolic pulmonary hypertension and patients with pulmonary arterial hypertension after double lung transplantation.

Representative publications:

- a. **Amsallem M**, Manzo-Silberman S, Dillinger JG, Sideris G, Voicu S, Bal dit Sollier C, Drouet L, Henry P. Predictors of high on-aspirin platelet reactivity in high-risk vascular patients treated with single or dual antiplatelet therapy. *Am J Cardiol.* 2015 May 1;115(9):1305-10.
- b. **Amsallem M**, Saito T, Tada Y, Dash R, McConnell MV. Magnetic Resonance Imaging and Positron Emission Tomography Approaches to Imaging Vascular and Cardiac Inflammation. *Circ J.* 2016 May 25;80(6):1269-77.
- c. Withana NP, Saito T, Ma X, Garland M, Liu C, Kosuge H, **Amsallem M**, Verdoes M, Ofori LO, Fischbein M, Arakawa M, Cheng Z, McConnell MV, Bogoyo M. Dual-Modality Activity-Based Probes as Molecular Imaging Agents for Vascular Inflammation. *J Nucl Med* 2016 Oct;57(10):1583-1590.

Complete List of Published Work in My Bibliography:  
<https://www.ncbi.nlm.nih.gov/pubmed/?term=amsallem+m>

## D. Research Support

**The RV-ROADMAP PROJECT** Haddad, F and Knowlton K (co-PIs)  
08/01/2017 – 07/30/2018

Actelion Pharmaceutical Grant

*Mapping the Right Heart-Endothelin Pathways in patients with Heart Failure, a ROADMAP for Clinical Trial Design*

This project seeks to better characterize the clinical phenotype of patients with heart failure and pulmonary hypertension with the ultimate objective to help guide clinical trial design.

**My contribution** in the project will be to provide RV adaptive phenotypes using echocardiography.

Overlap: none

**Project Baseline** Verily Life Science – Stanford – Duke collaboration  
06/01/2017-

Verily Life Science

*Project Baseline*

This project is a broad effort designed to develop a well-defined reference, or "baseline," of good health as well as a rich data platform that may be used to identify determinants of cardiovascular disease.

**My contribution** to the project is to participate to resting and exercise cardiovascular phenotyping of this large cohort.

**RHU BIOART-LUNG 2020** Mercier, O (PI)  
01/02/2016-12/30/2020

*France Artificial Lung Initiative*

This project seeks to understand the mechanisms of circulatory failure following surgery for patients with pulmonary hypertension and advanced lung disease; in addition the project aims at developing a prototype for a more effective artificial lung. Funding for the total grant: 5 million Euros.

**My contribution** to the project is to lead the clinical imaging (echocardiography, MRI including 4D blood flow) component of two clinical studies aiming to determine metabolomics and immune proteomics associated with reverse remodeling after endarterectomy in CTEPH or double lung transplantation in PAH. I also contribute in phenotyping the right heart of their piglet model of PH.

Overlap: none

**Young Investigator Seed Grant - Vera Moulton Wall Center** Amsallem, M (PI)  
Zamanian, R and Haddad, F (co-mentors)  
01/01/2016 – 04/30/2016

Vera Moulton Wall Center

*Immune and Genomic Determinants of Right Heart Failure in PAH*

The first part of this study aimed at determining which right heart imaging parameter (RV end-systolic remodeling or RV longitudinal strain) is useful to be incremental to validated risk scores in pulmonary arterial hypertension (published in Circ CV Imaging and presented at 2016 AHA) in the Vera Moulton Wall Center prospective cohort (n=228). The second part of this project was to identify circulating immune profiles associated with right heart failure in this cohort, collaborating with Andrew Sweat MD. We are currently working on a translational validation using iPSC endothelial cells.

**My contribution** in the project is to identify comprehensive imaging right heart phenotypes of patients with PAH.

Overlap: none

### **Federation Francaise de Cardiologie Grant**

Amsallem, M (PI)  
McConnell, MV (mentor)

11/01/2014-10/31/2015

Federation Francaise de Cardiologie

*Targeted PET/CT and PET/MRI Imaging of Vascular Inflammation*

This project sought to develop novel imaging techniques and tracers to image vascular inflammation (targeting macrophage receptors integrins) in small animal models aiming to clinical application.

**My contribution** to the project was to collaborate with Toshi Saito MD PhD to small animal model of AAA and carotid stenosis, applying novel tracers, and to co-write the protocol and develop the PET-MRI protocol with Michael V. McConnell MD MSEE and Nuclear Medicine team at Stanford.

Overlap: none