

## PERSONAL INFORMATION

**Helena de Puig Guixé**

Ph.D. Candidate

Department of Mechanical Engineering

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## EDUCATION

MIT Department of Mechanical Engineering <b>Ph.D. Candidate</b> in Mechanical Engineering. <b>Gehrke Lab.</b> Dissertation: Increasing the sensitivity of lateral flow devices for rapid, multiplexed disease diagnostics	2013-Present
MIT Engineering Systems Division Graduate Certificate in Technology and Policy (Minor). Prof. S.N. Finkelstein, Prof. K. Oye Dissertation: Prevention and diagnosis of mosquito-borne tropical diseases	2013-Present
MIT Department of Mechanical Engineering <b>MS</b> in Mechanical Engineering. <b>Hamad-Schifferli Lab.</b> Dissertation: "Control of blood clotting using gold nanorods"	2013
Institut Quimic de Sarria ( <b>IQS</b> ), Universitat Ramon Llull, Spain <b>Industrial Engineer</b>	2011
Master IQS in Research in Industrial Engineering	2011

## FELLOWSHIPS AND AWARDS

<b>Rafael del Pino Fellowship</b> for graduate students -Awarded to 12 students in Spain	2014-Present
<b>La Caixa Fellowship</b> to fulfill graduate studies in the US. - Awarded to 40 students in Spain, full tuition and stipend.	2011- 2013
Sage Scholar, Paris Assembly 2015 (Sage Bionetworks)	2015
MIT GSC conference travel grant	2013
Pare Salvador Gil Award from IQS for research excellence	2012
European Materials Research Society, Bionano@Nice travel award	2011
MOBINT fellowship from the Catalan Government	2010

## EXPERIENCE AND EMPLOYMENT HISTORY

<b>Graduate Research at MIT</b> Development of low-cost lab-on-a-chip devices for the diagnosis of tropical diseases. Synthesis and functionalization of gold nanoparticles for the detection of disease. Assembly and testing of point of care diagnostic devices. <b>Gehrke Lab</b> , Institute for Medical Engineering and Science, MIT-IMES; and Department of Microbiology and Immunobiology, Harvard University.	Cambridge, MA	June 2013
<b>Graduate Research at MIT</b> Synthesis of semiconductor nanowires by metal-organic chemical vapor deposition. Electron microscopy and characterization of semiconductors. <b>Gradečak Lab</b> . Department of Materials Science and Engineering, MIT	Cambridge, MA	January-June 2013

**Graduate Research at MIT**

Cambridge, MA

2010-2012

Control blood coagulation by laser excitation of nanoparticle-DNA conjugates. Characterization of protein coronas surrounding nanoparticles. Quantification of the interactions at the nanoscale.

**Hamad-Schifferli Lab**, Departments of Mechanical Engineering and Biological Engineering, MIT

**Undergraduate Research at IQS**

Barcelona, Spain

2009

Designed a spray drying machine to produce hydroxyapatite powder for three dimensional printing of knee prostheses. GEMAT

**Borros Lab**, IQS, URL

Internship at Iberpotash

Barcelona, Spain

Summer, 2008

Monitored the flow of the potash in the factory and designed a program to detect errors in the production process. Identified key modifications to improve the yield of the factory.

## PUBLICATIONS

6. H. de Puig, J. Tam, C. Yen, L. Gehrke, K. Hamad-Schifferli, "The Extinction Coefficient of Gold Nanostars." 2015, Journal of Physical Chemistry C, 110, 17408-17415
5. C. Yen, H. de Puig, J. Tam, J. Gómez-Márquez, I. Bosch, K. Hamad-Schifferli, L. Gehrke, "Multicolored silver nanoparticles for multiplexed disease diagnostics: distinguishing dengue fever, Yellow fever and Ebola Viruses." 2015, Lab on a Chip, 15, 1638-1641.  
The top-scoring Altmetrics article (#1 of 1410 articles) published in Lab on a Chip January-March 2015. Covered by over 60 press articles.
4. S. Tibbits, L. Kara'in, J. Schaeffer, H. de Puig, J. Gomez-Marquez, A. Young, "DNA disPLAY: Programmable Bioactive Materials Using CNC Patterning", 2014, Architectural Design, 84 (4).
3. A. Cifuentes Rius\*, H. de Puig\*, J. C.-Y. Kah, S. Borros, K. Hamad-Schifferli, "Optimizing the Properties of the Protein Corona Surrounding Nanoparticles for Tuning Payload Release", 2013, ACS Nano, 7(11).  
\*equal first authors
2. H. de Puig, A. Cifuentes Rius, D. C. Flemister, S.H. Baxamusa, K. Hamad-Schifferli, "Selective Light-Triggered Release of DNA from Gold Nanorods Switches Blood Clotting On and Off", 2013, PLoS ONE 8(7) : E68511.  
Covered by over 40 press articles.
1. H. de Puig\*, S. Federici\*, S.H. Baxamusa, P. Bergese, K. Hamad-Schifferli, "Quantifying the nanomachinery of the nanoparticle-biomolecule interface", Small, 2011, 7 (17), 2477-2484.  
\*equal first authors

## PATENTS

K. Hamad-Schifferli, H. de Puig, S.H. Baxamusa. Reversible control of blood clotting using light. U.S. Application No.: 61/973290.

## CONFERENCE PRESENTATIONS

13. **American Chemical Society (ACS)** Boston National Meeting, 2015. Oral Communication. "*Detection of biological threats using gold nanoparticles in lateral flow immunoassays: Dengue hemorrhagic fever*"
12. **American Chemical Society (ACS)** Boston National Meeting, 2015. Oral Communication. "*Loading and releasing payloads from protein coronas surrounding gold nanoparticles*"
11. **Materials Research Society (MRS)** Fall Boston, 2014. Oral Communication. "*Engineering the protein corona surrounding nanoparticles for biomedical applications*"
10. **Materials Research Society (MRS)** Fall Boston, 2014. Oral Communication. "*Engineering gold nanoparticles for lateral flow devices to detect tropical diseases*"
9. MIT-SUTD International Design Center, 2014 Poster. "*Engineered nanoparticles for the diagnosis of dengue in lateral flow immunoassays*"
8. MIT Materials Day, 2014. Poster. "*Engineering the protein corona surrounding nanoparticles for biomedical applications*"
7. MIT-SUTD International Design Center, 2013 Poster. "*Increasing the sensitivity of lateral flow devices for rapid diagnosis of tropical diseases*"

6. **Materials Research Society (MRS)** Spring San Francisco, 2013. Oral Communication. *"Gold nanorod optical switch for controlling blood clotting"*
5. MIT Materials Day, 2012. Poster. *"Triggered release from gold nanorods"*
4. **Materials Research Society (MRS)** Fall 2011 meeting. Poster. *"Selective triggered release from gold nanorods"*
3. **European Materials Research Society (E-MRS)**, Nice 2011 Spring meeting. Oral Communication. *"Control of blood clotting using gold nanorods"*
2. **American Chemical Society (ACS)**, Boston 2010 National meeting. Poster. *"Studying the interactions of gold nanoparticles with proteins"*
1. MIT Materials Day, 2010. Poster. *"Studying the interactions of gold nanorod-aptamer conjugates with thrombin"*

#### THESES

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1. MIT. M.S. in Mechanical Engineering. Dissertation: "Control of blood clotting using gold nanorods", 2013
2. IQS, URL. Master IQS in Industrial Engineering. Dissertation: "Nanomachinery at the nanoparticle-biomolecule interface", 2011
3. IQS, URL. Industrial Engineering Thesis. Dissertation: "Control of blood clotting using gold nanoparticles", 2011

#### LANGUAGES

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Spanish – Native language.  
 Catalan – Native language.  
 English – Fluent.

#### ACTIVITIES

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<b>Spain@MIT</b> Committee Member	2012-2014
<b>President</b> of the <b>Spanish Reining Horse Association</b> (equestrian sport). Also member of the board. - Collaborated with the Royal Spanish Equestrian Federation to organize the first Spanish Reining Championship. - Doubled the number of members within the Association.	2008-2010
<b>SPORTS</b>	
Reining Amateur Reserve Champion of Spain (CTO* ESP, CRN*).	2009
<b>VOLUNTEERING</b>	
Engineers Without Borders (EWB). Boston Chapter. Honduras team.	2014-Present
Nursing home in Kretinga, Lithuania. Montblanc Foundation. - Help in a nursing home with over 200 elderly people.	July 2003
Montalegre Association in Raval, Barcelona, Spain. - Recovery of old computers to be used in local schools.	2001-2005
Summer Camp Instructor in Mexico D.F. - Equine-assisted therapy for children between 7-12 years old.	Summer 2004
Volunteering in Cottolengo del Padre Alegre, in Barcelona, Spain.	2002
<b>EXTRACURRICULAR ACTIVITIES</b>	
Official Music studies. Instruments: Piano and Clarinet. Member of musical groups and bands as a pianist and clarinetist.	1994-2005

#### MEMBERSHIPS

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Enginyers Industrials de Catalunya (EIC), American Chemical Society (ACS), Materials Research Society (MRS), Engineers Without Borders (EWB)