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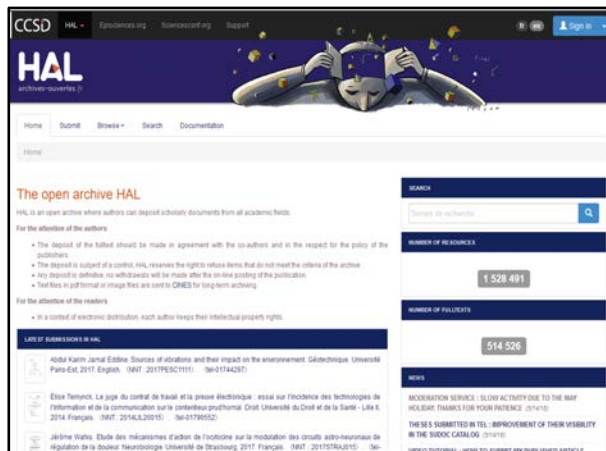
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## Cellular Computing and Least Squares for partial differential problems parallel solving

Nicolas Fressegeas

Correspondent author

— IdHAL : fresseng  
— ResearcherID : <http://www.researcherid.com/rid/B-9982-2012>  
— ORCID : <https://orcid.org/0000-0002-5534-712X>

Hervé Frezza-Buet <sup>2</sup> **AuthorID : 1006668**

Author

— IdHAL : herve-frezza-buet

**1** LMOPS - Laboratoire Matériaux Optiques, Photonique et Systèmes (Université de Lorraine - CentraleSupélec, 2 rue Edouard Belin, 57070 Metz - France) **StruInfId : 202903**

- CentraleSupélec (3, rue Joliot Curie, Plateau de Moulon, 91192 GIP-SUR-YVETTE Cedex - France) **StruInfId : 411579**
- UL - Université de Lorraine : EA4423 (34 cours Léopold - CS 25233 - 54052 Nancy cedex - France) **StruInfId : 413288**

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- SUPELEC-Campus Metz (2 rue Edouard Belin 57070 Metz - France) **StruInfId : 26305**
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**Abstract :** This paper shows how partial differential problems can be solved thanks to cellular computing and an adaptation of the Least Squares Finite Elements Method. As cellular computing can be implemented on distributed parallel architectures, this method allows the distribution of a resource demanding differential problem over a computer network.

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Nicolas Fressegeas, Hervé Frezza-Buet. Cellular Computing and Least Squares for partial differential problems parallel solving. *Journal of Cellular Automata*, Old City Publishing, 2014, 9 (1), pp.1-21. (hal-00107064v8)

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— ORCID : <https://orcid.org/0000-0002-5534-712X>

**1** LMOPS - Laboratoire Matériaux Optiques, Photoniques et Nanotechnologies (France) [StruclId : 202903](#)  
57070 Metz - France

- CentraleSupélec (3, rue Joliot Curie, Plateau de Moulon, 91192 Gif-sur-Yvette Cedex, France)
- UL - Université de Lorraine : EA4423 (34 cours Léopold, 54500 Vandœuvre-lès-Nancy, France)

**2** Information, Multimodality and Signal (France) [StruclId : 300912](#)  
• SUPELEC-Campus Metz (2 rue Edouard Belin 57070 Metz Cedex 2, France)  
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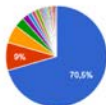
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### CO-AUTHORS

- Delphine Wolfersberger (2)
- Godefroy Kugel (4)
- Cristian Dan (2)
- Naima Kheifacou (1)
- Jean Maubry (1)
- Frédéric Genty (2)
- Sidi Ould Saad Hamady (1)
- Christyves Chevallier (1)
- Hervé Leblond (1)
- Joël Jacquet (1)

### RESEARCHER IDENTIFIERS

- iSHAL : fresseng
- ORCID : 0000-0002-5534-712X
- ResearcherId : B-9982-2012

### SOCIAL NETWORKS

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## Full professor Nicolas Fressengeas

Number of documents

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Lorraine university full professor

- Head of the Optical Materials and Photonic Systems Laboratory (LMOPS)
- Missionned for "Open Science" the Lorraine university

Details and opinions in French :

- Science and teaching blog : <http://fressengeas.net>
- Tweeting about science, teaching, and freedom : @fresseng
- LinkedIn Details

### JOURNAL ARTICLES

44 documents

Sidi Ould Saad Hamady, Nicolas Fressengeas. SLALOM: Open-source, portable, and easy-to-use solar cell optimizer. Application to the design of InGaN solar cells. *EPJ Photovoltaics*, EDP sciences, 2018, 9, pp.13. (10.1051/epjpv/2018011). (hal-01964575)

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The optical materials, photonics and systems laboratory (LMOPS)<sup>[1]</sup> gathers researchers from Lorraine university<sup>[2]</sup> and from CentraleSupélec<sup>[3], [4]</sup> in the cities of Metz, Saint-Avold and Thionville. The research themes lie in the fields of materials in general and optical materials more specifically, non linear optics, optical sensors and photovoltaics. Almost 30 researchers are working in the laboratory, side by side with roughly the same number of PhD students. The LMOPS was created in the year 2000, building from its ancestor, the **Laboratoire Matériaux optiques à propriétés spécifiques**,<sup>[5]</sup> which belonged to the Metz university, which teamed with Supélec in 2000.

Whereabouts

The LMOPS laboratory is spread over 4 cities:<sup>[1]</sup>

Its central part is situated in the Technopôle de Metz within the Metz campus of CentraleSupélec  
A second site in Metz is hosted by the Sciences fondamentales et appliquées Lorraine university unit, within the Institute for Material Physics and Chemistry  
The Saint-Avold site is hosted by the Institut universitaire de technologie de Moselle-Est, within the Lorraine university  
The Thionville site is hosted by the Institut universitaire de technologie de Thionville-Yutz within the Lorraine university.

Research teams

The research activities within the LMOPS<sup>[6]</sup> are structured through 4 research teams.<sup>[7]</sup>

The Functional Materials team deals with materials in general, particularly optical materials and polymers  
The Photonics team is mainly devoted to non linear optics  
The Raman sensors & Optical control team has a strong background in Raman spectroscopy  
The Photovoltaics team studies materials and systems for the harvesting of solar energy

Facilities

The LMOPS laboratory can rely on many optical spectrometers. One of the team is specialized in Raman Spectroscopy and thus works with many kinds of Raman spectrometers. In the laboratory can also be found absorption spectrometers, as well as X fluorescence spectrometers.

The electrical characterization of materials and devices is also an important aspect of the LMOPS activities. Facilities are available for measuring current-voltage curves, as a function of temperature if necessary, for determining the charge carriers, and for measuring capacity-voltage and impedance curves.

Finally, and amidst the many Laser sources which are always needed in such a laboratory, the LMOPS can rely on heavy equipment for actual material fabrication, such as ovens using the Czochralski process to grow bulk non linear crystals which are to be used for laser frequency doubling, as well as MOVPE equipments for the deposition of thin layers of semi-conductors. These heavy equipments are completed by a lightweight micro-pulling down crystalline fibre machine.

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## Cellular Computing and Least Squares for partial differential problems parallel solving

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Correspondent author

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Nicolas Fressengeas<sup>1</sup> AuthorId : 528973

**Correspondent author**  
— IdHAL : fresseng  
— ResearcherId : <http://www.researcherid.com/rid/161616>  
— ORCID : <https://orcid.org/0000-0002-5534-712X>

**1** LMOPS - Laboratoire Matériaux Optiques

- CentraleSupélec (3, rue Joliot Curie, Plateau de Moulon, 91192 Gif-sur-Yvette Cedex, France) StructId : 2022903
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jean-luc@centralesupelec.fr

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  - Mise en place du programme
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  - Edition électronique
  - Transfert vers l'archive ouverte HAL



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