# Seminar

# "Advances in Modeling of Microwave Sintering"

## March 8-9, 2010

## Institut Polytechnique de Grenoble
## Grenoble, France

This forum will be carried out as the next (**12th**) event in the series of seminar/workshops **"Computer Modeling in Microwave Engineering and Applications"** organized annually by the **Industrial Microwave Modeling Group (IMMG)** of **Worcester Polytechnic Institute (WPI),** Worcester, MA, USA. In 2010, the meeting will be co-organized by the **SIMaP Laboratory** of the **Grenoble Institute of Technology**.

The seminar series is run with the overall goal of *building better communications between microwave-oriented people with different expertise*. The seminars bring together researchers and engineers working in the field of microwave engineering along with analysts developing/dealing with related math/computer models in order to allow them to discuss issues of common interest.

## Overview

The main purpose of this seminar is to discuss:

(i) the current issues in *electromagnetic, thermal, and structural modeling of the process of microwave sintering* on the macroscopic level;

(ii) challenges in the related numerical mathematics and implementation of computational algorithms; and

(iii) problems slowing down the progress of modeling-based techniques for reconstruction of material parameters.

This interdisciplinary forum will bring together scientists with expertise in experimental sintering (including its microwave version) and researchers working on the development of math/computer models applicable to microwave sintering. The attendees will share their experience in the related fields aiming to work out the concepts and schemes which would be practical in comprehensive models for microwave sintering.

## Program Topics

*Technical Sessions*:

- Modern experimental techniques of controlling characteristics of microwave sintering.
- Numerical techniques of modeling of electromagnetic, thermal, and structural variations in the course of microwave sintering.
- Interaction of microwaves with dielectric and metallic powders: physics and mathematics

*Lectures*:

- 3D conformal FDTD technique and its implementation in *QuickWave-3D*. Demonstration of application of *QuickWave-3D* to solving electromagnetic-thermal coupled problems.
- Principles of FEM modeling of structural deformation of sintered materials with *Abaqus*. Demonstration of the software in operation.

## Venue

The seminar will be held in the facilities of Laboratoire SIMaP, Institut Polytechnique de Grenoble in Saint Martin d'Heres/Grenoble, France

## Expected Scientific Impact

The seminar discussions should help clarify the present status of

(a) the experimental development of the technology of microwave sintering in terms of available *control over electromagnetic, thermal, and structural processes in the material*, and

(b) the techniques and approaches to computer simulation of microwave sintering in terms of *compatibility and applicability of different numerical models representing different physical processes*.

The participants will discuss limitations of existing macroscopic models and identify physical and mathematical assumptions capable of making these models more adequate. *The seminar talks will present most advanced up to date results in both experimental development of microwave sintering and its computer modeling* and make the forum an excellent learning environment for participating *graduate students*.

Overall, this forum should assist in the *development of microwave sintering as a new efficient technology of production of nano-structured materials with unique physical properties*.

## Important Dates

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| Submission of titles and abstracts: | **January 15, 2010** |
| Notification of acceptance: | **January 25, 2010** |
| Submission of summaries: | **February 5, 2010** |
| Preliminary program: | **February 22, 2010** |
| Seminar & Final program: | **March 8-9, 2010** |

**Organized in cooperation with the Society for Industrial and Applied Mathematics (SIAM)**

**Endorsed by the Association for Microwave Power in Europe for Research and Education (AMPERE)**


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**More info & forms for online submission and registration are available at the seminar web page at http://www.wpi.edu/+CIMS/IMMG/Seminars/**