



كلية العلوم والتقنيات بني ملال  
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Faculté des Sciences et Techniques de Beni Mellal



ISyDMA  
Executive Committee

InSAM'3



# Programme

The 3<sup>rd</sup> International School on Advanced Materials (InSAM'3)

Main topic: Materials for Solar Energy

02-04 May 2023, Ouarzazate, Morocco

Organized by

Faculty of Sciences and Techniques,  
Sultan Moulay Slimane University of Beni-Mellal

in cooperation with

Executive Committee of the International Symposium on Dielectric  
Materials and Applications (ISyDMA)

and

Draa Association for Renewable Energies (DAREN)



## Preface

Welcome to InSAM'3, the Third International School on Advanced Materials, whose main topic is Materials for Solar Energy, organized in Ouarzazate, Morocco, by the Faculty of Sciences and Techniques of Sultan Moulay Slimane University of Beni-Mellal, in cooperation with the Executive Committee of the International Symposium on Dielectric Materials and Applications (ISyDMA) and Draa Association for Renewable Energies (DAREN). The 1st (First Moroccan School on Advanced Materials: MoSSAM'1, Faculty of Sciences Semlalia, Marrakech, Morocco, April 15-17, 2018) and 2<sup>nd</sup> (Second Moroccan School on Advanced Materials: MoSSAM'2, Moroccan Foundation for Advanced Science, Innovation and Research, MAScIR, Rabat, Morocco, June 24-25, 2019) schools in the series were successfully conducted with the participation of more than 65 young researchers. From the current edition, the name of the MoSSAM school will be changed to: International School on Advanced Materials (InSAM). This third edition of InSAM will focus on materials for solar energy.

We are delighted to invite you to attend the InSAM'3 school which will be held in May 02-04, 2023 at We are delighted to invite you to attend the InSAM'3 school which will be held in May 02-04, 2023 at the Congress Palace of Ouarzazate. The scope of this international school is to familiarize PhD students and junior researchers with the state of the art in advanced materials. The young researchers will have the opportunity to be specifically trained by leading researchers on advanced experimental techniques and theoretical approaches in various fields in materials science for solar energy. Posters will be on display throughout the InSAM'3 school. Poster presenters are encouraged to be present near their posters during coffee breaks each day. In addition, presenters are encouraged to present highlights from their posters in 5 minutes after courses (please see the session program). A poster competition will be organized with the nomination of the three best posters evaluated according to their scientific quality, the relevance of the research topic and the style of presentation. All courses and presentations at the InSAM'3 school will be in English. Furthermore, the young researchers will have the opportunity to discuss last methodologies and scientific advances. The program includes classes as well as social events.

## Chair Committee

- Prof. Mustapha Mabrouki, FST, Sultan Moulay Slimane University, Beni-Mellal, Morocco.
- Prof. Thami Ait-Taleb, Polydisciplinary Faculty of Ouarzazate, Ibnou Zohr University, Morocco.
- Prof. Hassan Chaib, Polydisciplinary Faculty of Ouarzazate, Ibnou Zohr University, Morocco.
- Prof. Amane Oueriagli, Faculty of Sciences Semlalia, Cadi Ayyad University, Marrakesh, Morocco.
- Prof. Mohamed Essaid Achour, Faculty of Sciences, Ibn Tofail University, Kenitra, Morocco.

## Contact

Prof. Mustapha Mabrouki, InSAM'3 School Chairman,  
Faculty of Sciences and Techniques of Beni-Mellal.

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## Sponsors



## Topics

The InSAM'3 school will provide an international forum for reporting the recent developments in advanced materials and applications, including, but not limited to, the following themes:

- **Topic I: Advanced materials:**

- Synthesis techniques of advanced materials and nanomaterials.
- Advanced structural materials, ceramics and composites.
- Biomaterials.
- Polymeric materials and polymer nanocomposites.
- Inorganic and hybrid materials.
- Nanostructured materials for functional applications.
- Nanomaterials single crystals, nanomaterials, multifunctional for diverse applications.
- Nanofluids for heat transfer.

- Thin film coatings.
- **Topic II: Solar energy:**
  - Development and use of solar energy.
  - Materials for energy conversion.
  - Solar fuels.
  - Storage technology and materials.
  - Energy-saving technology.
  - Green building materials.
  - Environmental materials.

## Committees

### Honorary Committee

- Prof. Abdelaziz Bendou, President of Ibnou Zohr University, Agadir, Morocco.
- Prof. Mustapha Aboumaarouf, President of Sultan Moulay Slimane University, Beni-Mellal, Morocco.
- Prof. Said Melliani, Dean of Faculty of Sciences and Techniques, Sultan Moulay Slimane University, Beni-Mellal, Morocco.

### Chair Committee

- Prof. Mustapha Mabrouki, Faculty of Sciences and Techniques, Sultan Moulay Slimane University, Beni-Mellal, Morocco.
- Prof. Thami Ait-Taleb, Polydisciplinary Faculty of Ouarzazate, Ibnou Zohr University, Morocco.
- Prof. Hassan Chaib, Polydisciplinary Faculty of Ouarzazate, Ibnou Zohr University, Morocco.
- Prof. Amane Oueriagli, Faculty of Sciences Semlalia, Cadi Ayyad University, Marrakesh, Morocco.
- Prof. Mohamed Essaid Achour, Faculty of Sciences, Ibn Tofail University, Kenitra, Morocco.

### Organizing Committee

- Prof. Abdelkader Outzourhit, Faculty of Sciences Semlalia, Cadi Ayyad University, Marrakesh, Morocco.
- Prof. Mustapha Ait Ali, Faculty of Sciences Semlalia, Cadi Ayyad University, Marrakesh, Morocco.
- Prof. Rajaa Touahni, Faculty of Sciences, Ibn Tofail University, Kenitra, Morocco.
- Prof. Amina Tachafine, Littoral-Côte d'Opale University, France.
- Prof. Yassine Darmane, Polydisciplinary Faculty of Ouarzazate, Ibnou Zohr University, Morocco.
- Dr. Dris Ait El Haj, Polydisciplinary Faculty of Ouarzazate, Ibnou Zohr University, Morocco.
- Prof. Younes El Bassem, Polydisciplinary Faculty of Ouarzazate, Ibnou Zohr University, Morocco.
- Prof. Rachid Idouhli, Faculty of Sciences Semlalia, Cadi Ayyad University, Marrakesh, Morocco.
- Prof. Mohamed Akhsassi, Faculty of Applied Sciences of Ait-Melloul, Ibnou Zohr University, Morocco.
- Prof. Mohammed Khenfouch, Faculty of Applied Sciences of Ait-Melloul, Ibnou Zohr University, Morocco.

- Prof. Lahcen Ouboubker, Faculty of Applied Sciences of Ait-Melloul, Ibnou Zohr University, Morocco.
- Prof. Abdelkrim El Mouatasim, Polydisciplinary Faculty of Ouarzazate, Ibnou Zohr University, Morocco.
- Dr. Ing. Mohamed Dharif, National Office for Electricity and Drinking Water, Ouarzazate, Morocco.
- Dr. Sofia Boukheir, MAScIR (Moroccan Foundation for Advanced Science, Innovation and Research), Rabat, Morocco.
- Dr. Yassine Nioua, Faculty of Sciences, Ibn Tofail University, Kenitra, Morocco.
- Dr. Najoia Aribou, Faculty of Sciences, Ibn Tofail University, Kenitra, Morocco.
- Dr. Zineb Samir, Faculty of Sciences, Ibn Tofail University, Kenitra, Morocco.
- Dr. Ilham Bouknaitir, Faculty of Sciences, Ibn Tofail University, Kenitra, Morocco.
- Dr. Chayma Naceur Aboueloula, Faculty of Sciences Semlalia, Cadi Ayyad University, Marrakesh, Morocco.
- Dr. Rajae Belhimria, Faculty of Sciences, Ibn Tofail University, Kenitra, Morocco.
- Dr. Souad Touairi, Faculty of Sciences and Techniques, Sultan Moulay Slimane University, Beni-Mellal, Morocco.
- Dr. Salma Kaotar Hnawi, Faculty of Sciences Semlalia, Cadi Ayyad University, Marrakesh, Morocco.
- Mr. Said Amounas, Polydisciplinary Faculty of Ouarzazate, Ibnou Zohr University, Morocco.
- Mr. Abdellah Hbab, Polydisciplinary Faculty of Ouarzazate, Ibnou Zohr University, Morocco.
- Mr. Lahcen Ait Lamine, Polydisciplinary Faculty of Ouarzazate, Ibnou Zohr University, Morocco.
- Mrs. Fatima Zahra Aoujil, Faculty of Sciences of Agadir, Ibnou Zohr University, Morocco.
- Mr. Ayoub Baalla, Polydisciplinary Faculty of Ouarzazate, Ibnou Zohr University, Morocco.
- Mr. Nidal Khemmou, Faculty of Sciences, Ibn Tofail University, Kenitra, Morocco.

## InSAM'3 Programme

Monday 01/05/2023		Arrival of the InSAM'3 participants to Ouarzazate				
Tuesday 02/05/2023	Morning	08:00 – 09:00 Reception and registration of participants	09:00 – 09:30 Official opening	09:30 - 11:00 <u>Topic I</u> <u>Session chairs</u> Pr. M. Mabrouki & Pr. A. Oueriagli <u>Course 1</u> Pr. R. M. Leblanc <u>Course 2</u> Pr. L. C. Costa	11:00-11:30 Coffee break	11:30 - 13:00 <u>Topic II</u> <u>Session chairs</u> Pr. Y. Darmane & Pr. H. Chaib <u>Course 3</u> Pr. T. Ait-Taleb <u>Course 4</u> Pr. A. Outzourhit
	Afternoon	14:30 - 15:15 <u>Topic II</u> <u>Session chair</u> Pr. C. Popov <u>Course 5</u> Pr. H. Oughaddou	14:15 - 16:00 <u>Topic II</u> <u>Session chair</u> Pr. T. Petkova <u>Course 6</u> Pr. M. Jouiad	16:00 - 16:45 <u>Topic I</u> <u>Session chairs</u> Pr. M. Striccoli & Dr. S. S. Teixeira <u>Course 7</u> Pr. T. Petkova		
Wednesday 03/05/2023	Morning	08:30 - 10:00 <u>Topic I</u> <u>Session chairs</u> Pr. L. C. Costa & Pr. M. Jouiad <u>Course 8</u> Pr. P Petkov <u>Course 9</u> Pr. M. Striccoli	10:00-11:00 Poster session & Coffee break	11:00 - 12:30 <u>Topic I</u> <u>Session chairs</u> Pr. H. Oughaddou & Pr. P Petkov <u>Course 10</u> Dr. S. S. Teixeira <u>Course 11</u> Pr. C. Popov		
	Afternoon	15:00 – 19:00	Visits: Kasbah of Ait Benhaddou Atlas Film Studio		19:00 – 22:00 Gala dinner	
Thursday 04/05/2023	Morning	08:30 - 10:00 <u>Topic II</u> <u>Session chairs</u> Pr. R. M. Leblanc & Pr. T. Ait-Taleb <u>Course 12</u> Pr. A. Vomiero <u>Course 13</u> Pr. M. Mabrouki	10:00 – 11:00 Oral presentations for the selected candidates for the awards	11:00 - 11:30 Coffee break	11:30 – 12:30 Closing session & Awards ceremony	
	Afternoon	14:30 - 19:00	Visits: Solar Complex Noor Ouarzazate Kasbah of Taourirt Cinema Museum Ouarzazate			
Friday 05/05/2023		Departure of the InSAM'3 participants from Ouarzazate Optional: Excursion (5 and 6 May 2023)				

# InSAM'3 Courses

## Topic I: Advanced materials

### 1. Roger M. Leblanc

- ✓ Affiliation: University of Miami, USA.
- ✓ Title: Applications of carbon dots as advanced nanomaterials.

### 2. Luis Cadillon Costa

- ✓ Affiliation: I3N, Physics Department, University of Aveiro, Portugal.
- ✓ Title: Using impedance spectroscopy to characterize materials.

### 3. Plamen Petkov

- ✓ Affiliation: Univ. of Chemical Technology and Metallurgy, Sofia, Bulgaria.
- ✓ Title: Advanced chalcogenide materials - preparation, characterization and application.

### 4. Tamara Petkova

- ✓ Affiliation: Bulgarian Academy of Sciences, Sofia, Bulgaria.
- ✓ Title: Advanced oxide materials for energy application.

### 5. Marinella Striccoli

- ✓ Affiliation: NRC, Inst. for Phys. and Chem. Proc., Bari Division, Bari, Italy.
- ✓ Title: Synthesis and assembly of solution-based nanomaterials towards advanced functionalities.

### 6. Silvia Soreto Teixeira

- ✓ Affiliation: I3N, Physics Department, University of Aveiro, Portugal.
- ✓ Title: Electrical properties of poly(L-lactic acid)/lithium ferrite composites.

### 7. Cyril Popov

- ✓ Affiliation: University of Kassel, Germany.
- ✓ Title: Properties and applications of diamond films.

## Topic II: Advanced materials for solar energy

### 1. Hamid Oughaddou

- ✓ Affiliation: CY Cergy Paris University, France.
- ✓ Title: Phosphorene: emerging new 2D material .

### 2. Thami Ait-Taleb

- ✓ Affiliation: Polydisciplinary Faculty of Ouarzazate, Ibnou Zohr Univ., Morocco.
- ✓ Title: Materials for energy storage.

### 3. Mustapha Jouiad

- ✓ Affiliation: Univ. of Picardie Jules Verne (UPJV), Amiens, France.
- ✓ Title: Nanomaterials engineering for solar energy.

### 4. Alberto Vomiero

- ✓ Affiliation: Dep. of Eng. Sci. and Math., Luleå Univ. of Tech., Luleå, Sweden.
- ✓ Title: Composite nano-systems for energy harvesting.

### 5. Mustapha Mabrouki

- ✓ Affiliation: Sultan Moulay Slimane Univ., Beni-Mellal, Morocco.
- ✓ Title: The performance of photovoltaic installations over time case study: FST Beni Mellal.

## 6. Abdelkader Outzourhit

- ✓ Affiliation: Cadi Ayyad University, Marrakesh, Morocco.
- ✓ Title: Recent developments in emerging solar cell technologies.

## InSAM'3 Detailed Programme

Tuesday 02 May 2023 - Morning	
8:00 - 9:00	Reception and registration of participants
9:00 - 9:30	Official opening
9:30 - 11:00	<b>Topic I</b> Session chairs: Pr. M. Mabrouki & Pr. A. Oueriagli Courses 1 and 2
	<u>Roger M. Leblanc</u> University of Miami, USA Applications of Carbon Dots as Advanced Nanomaterials  <u>Luis Cadillon Costa</u> I3N, Physics Department, University of Aveiro, Portugal Using impedance spectroscopy to characterize materials
11:00 - 11:30	Coffee Break
11:30 - 13:00	<b>Topic II</b> Session chairs: Pr. Y. Darmane & Pr. H. Chaib Courses 3 and 4
	<u>Thami Ait-Taleb</u> Polydisciplinary Faculty of Ouarzazate, Ibnou Zohr Univ., Morocco Materials for energy storage  <u>Abdelkader Outzourhit</u> Cadi Ayyad University, Marrakesh, Morocco Recent developments in Emerging solar cell technologies
Photo of InSAM'3 Group & Lunch	



**Tuesday 02 May 2023 - Afternoon**

<b>14:30 – 15:15</b>	<b>Topic II</b> <b>Session chairs: Pr. C. Popov</b> <b>Course 5</b>
	<b><u>Hamid Oughaddou</u></b> CY Cergy Paris University, France Phosphorene: emerging new 2D material
<b>15:15 - 16:00</b>	<b>Topic II</b> <b>Session chairs: Pr. T. Petkova</b> <b>Course 6</b>
	<b><u>Mustapha Jouiad</u></b> Univ. of Picardie Jules Verne (UPJV), Amiens, France Nanomaterials engineering for solar energy
<b>16:00 – 16:45</b>	<b>Topic I:</b> <b>Session chairs: Pr. M. Striccoli &amp; Dr. S. S. Teixeira</b> <b>Course 7</b>
	<b><u>Tamara Petkova</u></b> Bulgarian Academy of Sciences, Sofia, Bulgaria Advanced oxide materials for energy application

Wednesday 03 June 2023	
<b>8:30 - 10:00</b>	<b>Topic I</b> <b>Session chairs: Pr. L. C. Costa &amp; Pr. M. Jouiad</b> <b>Courses 8 and 9</b>
	<p style="text-align: center;"><b><u>Plamen Petkov</u></b>  Univ. of Chemical Technology and Metallurgy, Sofia, Bulgaria  Advanced chalcogenide materials - preparation, characterization and application</p> <p style="text-align: center;"><b><u>Marinella Striccoli</u></b>  NRC, Inst. for Phys. and Chem. Proc., Bari Division, Bari, Italy  Synthesis and assembly of solution-based nanomaterials towards advanced functionalities</p>
<b>10:00 - 11:00</b>	<b>Poster session &amp; Coffee break</b>
<b>11:00 - 12:30</b>	<b>Topic I</b> <b>Session chairs: Pr. H. Oughaddou &amp; Pr. P Petkov</b> <b>Courses 10 and 11</b>
	<p style="text-align: center;"><b><u>Silvia Soreto Teixeira</u></b>  I3N, Physics Department, University of Aveiro, Portugal  Electrical properties of Poly(L-lactic acid)/lithium ferrite composites</p> <p style="text-align: center;"><b><u>Cyril Popov</u></b>  University of Kassel, Germany  Properties and applications of diamond films</p>
<b>Lunch</b>	
<b>15:00 - 19:00</b>	<b>Visits: Kasbah of Ait Benhaddou Atlas Film Studio</b>
<b>19:00 - 22:00</b>	<b>Gala dinner</b>

Thursday 04 May 2023	
<b>8:30 - 10:00</b>	<b>Topic II</b> <b>Session chairs: Pr. R. M. Leblanc &amp; Pr. T. Ait-Taleb</b> <b>Courses 12 and 13</b>
	<p style="text-align: center;"><b><u>Alberto Vomiero</u></b>            Dep. of Eng. Sci. and Math., Luleå Univ. of Tech., Luleå, Sweden            Composite nano-systems for energy harvesting</p> <p style="text-align: center;"><b><u>Mustapha Mabrouki</u></b>            Sultan Moulay Slimane Univ., Beni-Mellal, Morocco            The performance of photovoltaic installations over time case study: FST            Beni Mellal, Morocco</p>
<b>10:00 - 11:00</b>	<b>Oral presentations for the selected candidates for the awards</b>
<b>11:00 - 11:30</b>	<b>Coffee break</b>
<b>11:30 - 12:30</b>	<b>Closing session &amp; Awards ceremony</b>
<b>12:30 - 14:00</b>	<b>Lunch</b>
<b>14:30 - 19:00</b>	<b>Visits: Solar Complex Noor Ouarzazate</b> <b>Kasbah of Taourirt</b> <b>Cinema Museum Ouarzazate</b>
Friday 05 May 2023	
<b>Departure of the InSAM'3 participants from Ouarzazate</b> <b>Optional: Excursion (5 and 6 May 2023)</b>	

## Poster Sessions

### Poster session A

- Poster 01:
  - ✓ Title:
  - ✓ Presenter:
- Poster 02:
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