



MaMiNa
European Network



1st MaMiNa Winter School on Functional Coatings, January 23 – 27, 2012

School description:

Surfaces have a very important role for the function of many products. Surface treatments and coatings can modify the surface properties strongly and can thus contribute to achieve new or improved product functions. One of the most important areas of functional coatings is tribology, where hard and superhard coatings are applied to increase the wear resistance, to improve the anti-adhesion tendency or to change the friction coefficient of a substrate.

This school will give an introduction to the state of the art of tribological thin-film coatings: material composition, deposition processes and analysis techniques. This will be achieved by lectures as well as by practical demonstrations and trainings. This topic will be complemented by an introduction to Design of Experiments (statistical experiment planning). The school is a part of the Marie-Sklodowska-Curie Initial Training Network 'Macro-, Micro- and Nano-aspects of Machining – MaMiNa'. It is open for MaMiNa Early Stage Researchers from Czech Republic, Estonia, France, Germany, Great Britain, India, Italy, Pakistan, Poland, Russia, Slovak Republic and Switzerland as well as for external participants. It addresses master students, doctoral candidates and postdoctoral researchers.

The school is split into part A that will take place in Lodz, Poland and part B, which will take place in Braunschweig, Germany.

Hosts:

- Institute of Materials Science and Engineering, Mechanical Engineering Faculty of the Technical University of Lodz (LUT), Poland
- Fraunhofer Institute for Surface Technology and Thin Films IST, Braunschweig, Germany

General Programme:

- **Theoretical lectures (total 2 days)**
- **Practical work (total 1 day)**
- **2 evening social events**

Terms of participation

Participation is possible for both parts or only for part A or part B. Please apply for each part separately following the deadline, see below! As the number of participants is restricted the registration will be made on a first come – first serve basis.

The participation is free of charge. It includes lunches, drinks during the breaks and documentation (book 'Functional Coatings' by Prof. Bogdan Wendler + CD of the presentations). Participants must pay for their travel and accommodation. Expenses during the social events are not included.

Deadline for application: January 4, 2012

Application for part A (Lodz): By e-mail to m.makowka@gmail.com

Application for part B (Braunschweig): By e-mail to seda.eras@ist.fraunhofer.de

Together with the registration acknowledgement you will receive information about travel and accommodation.

Places

Part A: Institute of Materials Science and Engineering, Technical University of Lodz, Stefanowskiego 1/15, 90924 Lodz, Poland (Next airport is Warsaw).

Part B: Fraunhofer Institute for Surface Engineering and Thin Films IST, Bienroder Weg 54 E, 38108 Braunschweig, Germany (Next airport is Hannover).



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Part A

Venue: Institute of Materials Science and Engineering, Technical University of Lodz,
Stefanowskiego 1/15, 90924 Lodz, Poland

Date	General topic	Time	Content	Lecturer
Mon. Jan. 23, 2012	Lunch	12 ⁰⁰ – 13 ⁰⁰	Lunch in a students' mess-room at LUT	
	Lectures	13 ⁰⁰ – 14 ⁰⁰	Introduction to thin films (I)	Assoc. Prof. Hieronim Szymanowski (LUT)
		14 ⁰⁰ – 15 ⁰⁰	Basics of vacuum deposition	Dr. Wojciech Pawlak (LUT)
		15 ⁰⁰ – 15 ¹⁵	Break	
	Practical training	15 ¹⁵ – 17 ¹⁵	Vacuum and plasma technology	Dr. Wojciech Pawlak (LUT)
		17 ¹⁵ – 18 ³⁰	Accommodation in IBIS Hotel in Lodz	
		19 ⁰⁰ – 22 ⁰⁰	1 st evening social event (Manufaktura – Lodz Shopping & Leisure Centre)	
Tue. Jan. 24, 2012	Lectures	9 ⁰⁰ – 10 ⁰⁰	Introduction to thin films (II)	Assoc. Prof. Hieronim Szymanowski (LUT)
		10 ⁰⁰ – 11 ⁰⁰	Diamond CVD	Dr. Lothar Schaefer (IST)
		11 ⁰⁰ – 11 ¹⁵	Break	
		11 ¹⁵ – 12 ¹⁵	CVD diamond tools	Dr. Jan Gaebler (IST)
		12 ¹⁵ – 13 ¹⁵	Functional coatings I – Modern tribological coatings	Prof. Bogdan Wendler (LUT)
		13 ¹⁵ – 14 ⁰⁰	Lunch in a students' mess-room at LUT	
	Lectures	14 ⁰⁰ – 15 ⁰⁰	Functional Coatings II – Coatings for cutting tools	Prof. Bogdan Wendler (LUT)
		15 ⁰⁰ – 15 ¹⁵	Break	
15 ¹⁵ – 17 ⁰⁰		Superhard nanocomposite coatings	Prof. Bogdan Wendler (LUT)	
Practical training	17 ⁰⁰ – 18 ⁰⁰	Deposition of a superhard nanocomposite nc-TiN/Si₃N₄ coating by a new gas pulse MS method	Massimo Lorusso and Ivan Progalskiy (LUT)	
Wed. Jan. 25, 2012	Travel from Lodz to Braunschweig			

Further information about part A:

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www.hardcoating.eu



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Part B

Venue: Fraunhofer Institute for Surface Engineering and Thin Films IST
Bienroder Weg 54 E, 38108 Braunschweig, Germany

Thu. Jan. 26, 2012	Lectures and demon- stration	9 ⁰⁰ – 10 ⁰⁰	Amorphous carbon films (DLC)	Dr. Klaus Bewilogua (IST)
		10 ⁰⁰ – 11 ⁰⁰	Cubic boron nitride (c-BN) coatings	Dr. Martin Keunecke (IST)
		11 ⁰⁰ – 11 ¹⁵	Break	
		11 ¹⁵ – 12 ⁴⁵	Plasma diffusion treatment of steel, stainless steel, Ti, Al and other metals	Peter Kaestner (TUBS)
		12 ⁴⁵ – 13 ³⁰	Lunch in cafeteria	
	Lectures and demon- stration	13 ³⁰ – 14 ³⁰	Plasma diffusion treatment of hard coatings	Prof. Bogdan Wendler (LUT)
		14 ³⁰ – 15 ³⁰	Analysis of surfaces and coatings I – Secondary Ion Mass Spectroscopy (SIMS), Electron Probe Micro Analysis (EPMA)	Dr. Kirsten Schiffmann (IST)
		15 ³⁰ – 15 ⁴⁵	Break	
	Practical Demon- stration	15 ⁴⁵ – 18 ¹⁵	Analysis of surfaces and coatings II – Rockwell C test, Calotte Grinding Test, Confocal Microscope	Reinhold Bethke (IST)
		Evening	Social Event	
Fri. Jan. 27, 2012	Lecture	9 ⁰⁰ – 9 ⁴⁵	Analysis of surfaces and coatings III – X-ray Photon Spectroscopy (XPS)	N. N. (IST)
	Practical Demon- stration	9 ⁴⁵ – 10 ³⁰	Analysis of surfaces and coatings IV – Sandblasting test for diamond coatings	Antje Hagemann (IST)
		10 ³⁰ – 10 ⁴⁵	Break	
	Lecture	10 ⁴⁵ – 11 ⁴⁵	Design of Experiments – Introduction	Dr. Markus Höfer (IST)
	Practical Demon- stration	11 ⁴⁵ – 12 ⁴⁵	Design of Experiments – Practical implementation for the planning of deposition processes	Seda Erbas (IST)
		12 ⁴⁵ – 13 ⁴⁵	Lunch in cafeteria	
		13 ⁴⁵	End of school	

Further information about part B:

Fraunhofer IST

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