Ist 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 part of the Marie-Curie Initial Training Network 'Macro, Micro and Nano Aspects of Machining – MaMiNa'. It is open for MaMiNa Early Stage Reasearchers as well as for external participants. It addresses master students, doctoral candidates and postdoctoral researcher.
The school is split in 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 seperately 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 accomodation. 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.erbas@ist.fraunhofer.de

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

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}	Accomodation in IBIS Hotel in Lodz	
		19^{00} – 22^{00}	1st 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/Si_3N_4 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:

Technical University of Lodz
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www.hardcoating.eu

I[st] MaMiNa Winter School on Functional Coatings

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:

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