



## Seminar@PhD Course in Nanotechnology

Wednesday 27 January 2016 at 11:00

Building H3, third floor, room 3B

# Dye Doped Silica Nanoparticles as Luminescent Organized Systems for Nanomedicine

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### *Abstract*

Silica nanoparticles are versatile platforms with many intrinsic features, including a low toxicity. Proper design and derivatization yield particularly stable, very bright nanosystems displaying multiple functions, which can be used for either photoluminescence (PL) or electrochemiluminescence (ECL) sensing, labelling or imaging applications. [1,2] For these reasons silica nanoparticles already offer unique opportunities, and further improvement and optimization can substantially increase their applications in fields of high impact, such as medical diagnostics and therapy, environmental and food analysis, and security. This contribution will describe multi-component silica-core/PEG-shell nanoparticles (NPs), tailored for optimization of processes such as directional energy transfer, which provide those systems with extremely valuable functions: high light-harvesting capability, signal-to-noise maximization, multiplex output, signal amplification, also for in vivo imaging [1-5].

[1] S. Bonacchi, D. Genovese, R. Juris, M. Montalti, L. Prodi, E. Rampazzo, N. Zaccheroni. Luminescent silica nanoparticles: extending the frontiers of brightness. *Angew. Chem. Int. Ed.* 50 (2011) 4056.

[2] M. Montalti, L. Prodi, E. Rampazzo, N. Zaccheroni. Dye Doped Silica Nanoparticles as Luminescent Organized Systems for Nanomedicine. *Chem. Soc. Rev.*, 43, (2014) 4243.

[3] E. Rampazzo, S. Bonacchi, D. Genovese, R. Juris, M. Sgarzi, M. Montalti, L. Prodi, N. Zaccheroni, G. Tomaselli, S. Gentile, C. Satriano, E. Rizzarelli. A versatile strategy for signal amplification based on Core/Shell Silica Nanoparticles. *Chem. Eur. J.* 17 (2011) 13429.

[4] E. Rampazzo, R. Voltan, L. Petrizza, N. Zaccheroni, L. Prodi, F. Casciano, G. Zauli, P. Secchiero. Proper design of silica nanoparticles combine high brightness, lack of cytotoxicity and efficient cell endocytosis. *Nanoscale*, 5, (2013) 7897.

[5] E. Rampazzo, F. Boschi, S. Bonacchi, R. Juris, M. Montalti, N. Zaccheroni, L. Prodi, Calderan, B. Rossi, L. S. Becchi, A. Sbarbati. Multicolor Core/Shell Silica Nanoparticles for in vivo and ex-vivo Imaging. *Nanoscale* 4 (2012) 824.