OLIVIER Jean CAYRE

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Academic Positions

- Post-Doctoral Research Fellow, *Department of Biomolecular and Chemical Engineering, North Carolina State University (NCSU), Raleigh, NC (Dec 2005-Present)*
- Post-Doctoral Research Fellow, *Department of Chemistry, University of Hull, UK (Jul-Sept 2005)*

Education

- Ph.D., Physical Chemistry & Colloid Science, *University of Hull, UK* (2001-2005)
- M.Sc., Physical Chemistry, *University Paul Sabatier (UPS), Toulouse, France* (1999-2001)
- B.Sc., Physics, Physical Chemistry and Chemistry, *UPS, Toulouse, France* (1995-1999)

Research Interests

- Surface and Colloid Science: particle and surfactant interactions in solution and at interfaces, surfactant and colloidal systems self-assembly, anisotropic particle synthesis and manipulation by external forces (electric and magnetic fields, microwaves)
- Study of colloids, hydrocolloids and polymers properties and their use for the preparation of smart materials, drug delivery systems, sensors and actuators

Experience

Post-Doctoral Researcher

Velev group, NCSU, (2006)

- Observation and control of anisotropic particle motion via induced charged electrophoresis in AC electric field
- Preparation of colloidal crystals of novel symmetries from anisotropic microparticles
- Fabrication of flexible electronic circuits from hydrocolloid gels of variable conductivity

Surfactant & Colloid Group, University of Hull (2005)

- Foam stabilisation using only edible fibres (sponsored by Unilever, Holland)
- Observation of the behaviour of Clay nanoparticles at liquid surfaces by replication of particle monolayer and Scanning Electron Microscopy studies.

Graduate Researcher

Surfactant & Colloid Group, University of Hull (2001-2005)

Ph.D.Thesis: Preparation and Characterisation of Anisotropic Particles and Microstructures

- Development of a Gel Trapping Technique for the determination of colloidal particle wettability via SEM observation of replicated monolayer at interfaces.
- Synthesis of several types of anisotropic colloid particles and study of their self-assembly.

- Microcontact-printing of different surfactant films and colloidal monolayers.
- Polarization of surfactant monolayers on emulsion drop surfaces using electric field.
- Preparation of miniemulsions of polymerisable oil and study of their stability and spreading at solid-liquid interfaces.
- Development of a simple and non-destructive method for the preparation of highly stable colloidosomes.
- Fabrication of non-spherical particles of homogeneous shape via suspension polymerisation in elastic aqueous gel systems.

Teaching Assistant

Department of Chemistry, University of Hull (2001-2005)

- Basic Principles in Physical Chemistry (1st year undergraduate, springs 2004 and 2005)
- Colloid Chemistry (3rd year undergraduate, fall 2004)

Research Mentor

Velev group, NCSU, (2006)

- Preparation of novel types of colloidal crystals from anisotropic microparticles suspended in AC electric field

Surfactant & Colloid Group, University of Hull (2001-2005)

- Preparation of non-spherical colloid particles form oil-in-water emulsion drops by using elastic properties of several polysaccharides (Summer 2005)
- Preparation of aqueous gel beads in water with a shell of yeast cells ("cellosomes") for drug delivery applications (Summer 2005)
- Stabilisation of foams using edible colloidal microrods and modified fibres (Spring 2005)
- Preparation of solid stabilized water-in-oil emulsions for further transfer to aqueous phases (Spring 2004)
- Fabrication of vesicles via transfer of gelled aqueous droplets through oil-water interfaces (Spring 2004)
- Wettability study of hydrophilic surfaces containing different hydrophobic patterns (Spring 2003)

Conference Presentations

- Cayre O.J., "*Preparation and Characterisation of Anisotropic Particles and Microstructures*", **Oral Presentation**, **Final Year PhD Student Seminar Competition**, Department of Chemistry, university of Hull; (June 2005).
- Cayre O. J., and Paunov V.N., "*The Gel Trapping Technique-New Method for the Determination of Particle Contact Angle and the Preparation of Novel Colloidal Microstructures*"; **Oral Presentation, Colloid and Nanoscale Engineering Workshop**, Department of Chemical Engineering, NCSU, NC; (December 2004).
- Noble P.N., Cayre O.J. and Paunov V.N., "*Preparation of Novel Gelled Aqueous Core Colloidosomes for Drug Delivery Applications*"; **Poster Presentation, Annual Fall Meeting MRS**, Boston, MA; (December 2004).
- Cayre O. J., Velev O.D. and Paunov V.N., "*Preparation of Unsymmetrically Coated Colloid Particles by Microcontact Printing Technique*"; **Oral Presentation, Europe's Younger Chemists and Chemical Engineers Conference**, Torino, Italy; (September 2004).
- Cayre O. J., Velev O.D. and Paunov V.N., "*Preparation of Unsymmetrically Coated Colloid Particles by Microcontact Printing Technique*"; **Oral Presentation, Colloid & Material Engineering Workshop**, Department of Chemical Engineering, NCSU, NC; (December 2003).
- Cayre O. J. and Paunov V.N., "*The Gel Trapping Technique – A Novel Method for Characterization of the Wettability of Microparticles and Replication of Particle Monolayers*"; **Poster Presentation, Annual Fall Meeting MRS**, Boston, MA; (November 2003).

- Cayre O. J., Velev O.D. and Paunov V.N., "*Preparation of Monodisperse Dipolar Latex Particles by Micro-contact Printing Techniques*"; **Poster Presentation, Special Presentations by Britain's Younger Chemists, Chemical Engineers and Technologists**, House of Commons, London, UK; (October 2003).
- Cayre O. J., Velev O.D. and Paunov V.N.; "*Preparation of Monodisperse Dipolar Latex Particles by Micro-contact Printing Techniques*"; **Poster Presentation, European Student Colloid Conference,** Bristol, UK; (July 2003).

Honours, Language Skills and Activities

- Award of the 1st prize for the best oral presentation during the final year PhD student competition at the Department of Chemistry at Hull University (June 2005)
- Nomination for the best poster at the MRS fall 2004 conference
- Award of the Messel Travel Grant by the Society for Chemistry (SCI) in Industry to attend MRS Fall Meeting, Boston, 2004
- Award of the Cavendish Medal for the most outstanding piece of research by a younger researcher at the Special Presentations by Britain's Younger Chemists, Chemical Engineers and Technologists (House of Commons, London, UK, October 2003)

- Speaks French (native), English(fluent), Spanish (conversational skills)

- Organisation of the Colloid and Surfactant Young Chemists Workshop at the University of Hull (June 6th 2005): oral presentations and poster session
- Member MRS (2003-2005)
- Member SCI (2004-2006)
- Member of Hull University Volley-Ball Team (2003-2005), and NCSU Soccer League (2006)

Scientific Publications

- Courbaron A-C., Cayre O.J. and Paunov V.N., "Non-spherical microparticles preparation by suspension polymerisation of oil droplets in elastic aqueous gels", in preparation
- Cayre O.J., Wege H.A., Velev O.D. and Paunov V.N., "Bulk preparation of dipolar microparticles by surfactant monolayer polarisation on polymerisable oil droplets using electric field", in preparation
- Cayre O.J., Noble P.F. and Paunov V.N., "Fabrication of novel colloidosome microcapsules with gelled aqueous cores", *Journal of Materials Chemistry*, 14, (2004), 3351-3355
- Cayre O.J. and Paunov V.N., "Fabrication of microlens arrays by gel trapping of self-assembled particle monolayers at the decane–water interface", *Journal of Materials Chemistry*, 14, (2004), 3300-3302
- Noble P.F., Cayre O.J., Alargova R.G., Velev O.D. and Paunov V.N., "Fabrication of "Hairy" Colloidosomes with Shells of Polymeric Microrods", *Journal of the American Chemistry Society*, 126, (2004), 8092-8093
- Campbell A., Taylor P., Cayre O.J. and Paunov V.N., "Preparation of aqueous gel beads coated by lipid bilayers", *Chemical Communications*, 21, (2004), 2378-2379
- Cayre O.J. and Paunov V.N. "Contact Angles of Colloid Silica and Gold Particles at Air-Water and Oil-Water Interfaces Determined with the Gel Trapping Technique", *Langmuir*, 20, (2004), 9594-9599
- Paunov V.N. and Cayre O.J. "Supra-Particles and "Janus" Particles Fabricated by Replication of Particle Monolayers at Liquid Surfaces with the Gel Trapping Technique ", *Advanced Materials*, 16, (2004), 788-791

- Cayre O., Paunov V.N., Velev O.D., "Fabrication of Asymmetrically Coated Colloid Particles by Microcontact Printing Techniques", *Journal of Materials Chemistry*, 10, (2003), 2445-2450
- Cayre O., Paunov V.N. and Velev O.D., "Fabrication of Dipolar Colloid Particles by Microcontact Printing", *Chemical Communications*, 18, (2003), 2296-2297

Refereed Conference Publications

- Cayre, O.J. and Paunov, V.N., "The Gel Trapping Technique: A Novel Method For Characterizing The Wettability Of Microparticles And The Replication Of Particle Monolayers", NATO ASI CMP Proceedings (2004).
- Noble P.F., Cayre O.J., Alargova R.G., Velev O.D. and Paunov V.N., "Fabrication of Novel Types of Colloidosome Microcapsules for Drug Delivery Applications", *MRS Proceedings Fall* (2004), AA5.18.1.
- Paunov V.N. and Cayre O.J. "The Gel Trapping Technique – A Novel Method for Characterization of the Wettability of Microparticles and Replication of Particle Monolayers", *MRS Proceedings Fall (2003)*, M8.25.1-3.
- Cayre O.J., Paunov V.N. and Velev O.D., "Preparation of Unsymmetrically Coated Colloid Particles by Microcontact Printing Techniques", *MRS Proceedings Fall* (2003), M3.6.1-3.

References

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