Dr. Carmen Cristina Piras
Postdoctoral Research Associate
Chemistry
Email: carmen.piras@york.ac.uk

Research interests

Supramolecular hydrogels, tissue engineering, 3D cell culture

Research interests

I am currently working as a PDRA in the group of Prof David Smith on an ESRC funded project titled "Multi-Domain Self-Assembled Gels: From Multi-Component Materials to Spatial and Temporal Control of Multi-Component Biology". This is a joint project with Prof Paul Genever at the Biology Department.
The field of supramolecular biomaterials has seen a wide expansion in the last few years towards functional versatile materials for a broad range of biological applications. In this perspective, achieving spatial and temporal control over gelation offers a unique opportunity to more effectively reproduce the dynamic natural environment of tissues. The fabrication of spatially defined multidomain biomaterials with different properties (e.g. stiffness and porosity) in the different domains allows controlling the release of bioactive molecules in specific gel domains and directing the proliferation, migration and differentiation of cells.
This project focuses on the development of novel patterned multi-domain gels for (i) the controlled release of active ingredients, (ii) the organisation of localised, addressable, conducting pathways and, (iii) spatial and temporal control over stem cell tissue growth and differentiation.

Employment

Postdoctoral Research Associate
Post doctoral research assistant
Chemistry
University of York
Heslington, York
1 Sept 2021 → 31 Dec 2021

Postdoctoral Research Associate
Post doctoral research assistant
Chemistry
University of York
Heslington, York
8 Jan 2018 → 20 May 2021

Postdoctoral Research Associate
Katholieke Univ Leuven, Catholic University of Leuven, Insituut Kern Stralingsfys
Belgium
1 Sept 2016 → 31 Dec 2017

Research outputs

Photopatterned Hybrid Supramolecular/Polymer Hydrogels for Controlled Heparin Release and Stem Cell Growth
Lopez-Acosta, A., Chivers, P., Piras, C. C., Kay, A. G., Genever, P. & Smith, D. K., 5 Jul 2024, In: ChemNanoMat. 9 p., e202400183.

Probing the Gelation Synergies and Anti-Escherichia coli Activity of Fmoc-Phenylalanine/Graphene Oxide Hybrid Hydrogel
Sitsanidis, E., Dutra, L., Schirmer, J., Chevigny, R., Lahtinen, M., Johansson, A., Piras, C. C., Smith, D. K., Tiirola, M., Pettersson, M. & Nissinen, M., 21 Mar 2023, In: ACS Omega. 8, 11, p. 10225–10234 10 p.

Mechanically Robust Hybrid Gel Beads Loaded with “Naked” Palladium Nanoparticles as Efficient, Reusable, and Sustainable Catalysts for the Suzuki–Miyaura Reaction
Albino, M., Burden, T. J., Piras, C. C., Whitwood, A. C., Fairlamb, I. J. S. & Smith, D. K., 6 Feb 2023, In: ACS Sustainable Chemistry & Engineering. 11, p. 1678-1689 12 p.

Wet-spinning multi-component low-molecular-weight gelators to print synergistic soft materials
Drew, E., Piras, C. C., Fitremann, J. & Smith, D. K., 14 Sept 2022, In: Chemical communications. 58, p. 11115-11118 4 p.

Combining gellan gum with a functional low-molecular-weight gelator to assemble stiff shaped hybrid hydrogels for stem cell growth
Piras, C. C., Genever, P. & Smith, D. K., 2 Sept 2022, In: Materials Advances. 3, p. 7966-7975 10 p.

Shaping and Patterning Supramolecular Materials – Stem Cell Compatible Dual-Network Hybrid Gels Loaded with Silver Nanoparticles
Piras, C. C., Mahon, C. S., Genever, P. & Smith, D. K., 9 May 2022, In: ACS Biomaterials Science & Engineering. 8, 5, p. 1829-1840

Self-assembled gel tubes, filaments and 3D-printing with in situ metal nanoparticle formation and enhanced stem cell growth
Piras, C. C., Kay, A. G., Genever, P., Fitremann, J. & Smith, D. K., 27 Jan 2022, (E-pub ahead of print) In: Chemical Science. 13, p. 1972-1981 10 p.

Triggering a transient organo-gelation system in a chemically active solvent
Chevigny, R., Schirmer, J., Piras, C. C., Johansson, A., Kalenius, E., Smith, D. K., Pettersson, M., Sitsanidis, E. & Nissinen, M., 15 Sept 2021, (E-pub ahead of print) In: Chemical communications. 57, 80, p. 10375-10378

Double diffusion for the programmable spatiotemporal patterning of multi-domain supramolecular gels
Cooke, H., Schlichter, L., Piras, C. C. & Smith, D. K., 18 Aug 2021, In: Chemical Science. 12, p. 12156-12164 9 p.

Hybrid Self-Assembled Gel Beads for Tunable pH-Controlled Rosuvastatin Delivery
Patterson, A., Piras, C. C. & Smith, D. K., 4 Aug 2021, In: Chemistry : A European Journal. 27, p. 13203-13210

Self-Propelling Hybrid Gels Incorporating an Active Self-Assembled Low-Molecular-Weight Gelator
Piras, C. C. & Smith, D. K., 2 Aug 2021, (E-pub ahead of print) In: Chemistry : A European Journal. 27, 58, p. 14527-14534 8 p.

Self-assembled low-molecular-weight gelator injectable microgel beads for delivery of bioactive agents
Piras, C. C., Kay, A. G., Genever, P. & Smith, D. K., 8 Feb 2021, In: Chemical Science. 12, p. 3958-3965

Spatial and Temporal Diffusion-Control of Dynamic Multi-Domain Self-Assembled Gels
Schlichter, L., Piras, C. C. & Smith, D. K., 8 Feb 2021, (E-pub ahead of print) In: Chemical Science. 12, p. 4162-4172 11 p.

Facile Method to Obtain Low DS β-ketoesters and Esters of Microfibrillated Cellulose
Piras, C. C., Jamieson, S., Fratini, E., Fernandez-Prieto, S., Smets, J. & De Borggraeve, W. M., 30 Oct 2020, In: Fibers and Polymers. 21, 10, p. 2166-2172 7 p.

Multicomponent polysaccharide alginate-based bioinks
Piras, C. C. & Smith, D. K., 10 Aug 2020, (E-pub ahead of print) In: Journal of Materials Chemistry B. 8, p. 8171-8188 18 p.

Self-Assembled Supramolecular Hybrid Hydrogel Beads Loaded with Silver Nanoparticles for Antimicrobial Application
Piras, C. C., Mahon, C. S. & Smith, D. K., 15 Apr 2020, (E-pub ahead of print) In: Chemistry : A European Journal. 26, p. 8452-8457 6 p.

Self-Assembling Supramolecular Hybrid Hydrogel Beads
Piras, C. C., Slavik, P. & Smith, D. K., 2 Jan 2020, In: Angewandte Chemie International Edition. 59, 2, p. 853-859 7 p.

Green approach for the activation and functionalization of jute fibers through ball milling
Gallego, R., Piras, C. C., Rutgeerts, L. A. J., Fernandez-Prieto, S., De Borggraeve, W. M., Franco, J. M. & Smets, J., Jan 2020, In: Cellulose. 27, 2, p. 643-656 14 p.

Sequential Assembly of Mutually-Interactive Supramolecular Hydrogels and Fabrication of Multi-Domain Materials
Piras, C. C. & Smith, D. K., Aug 2019, In: Chemistry : A European Journal. 25, 48, p. 11318-11326 9 p.

Ball milling: A green technology for the preparation and functionalisation of nanocellulose derivatives
Piras, C. C., Fernández-Prieto, S. & De Borggraeve, W. M., 9 Jan 2019, In: Nanoscale Advances. 1, 3, p. 937-947 11 p.

Circular dichroism studies of low molecular weight hydrogelators: The use of SRCD and addressing practical issues
Sitsanidis, E. D., Piras, C. C., Alexander, B. D., Siligardi, G., Jávorfi, T., Hall, A. J. & Edwards, A. A., Jun 2018, In: Chirality. 30, 6, p. 708-718 11 p.

Nanocellulosic materials as bioinks for 3D bioprinting
Piras, C. C., Fernández-Prieto, S. & De Borggraeve, W. M., Oct 2017, In: Biomaterials Science. 5, 10, p. 1988-1992 5 p.

Stabilizing silica nanoparticles in hydrogels: impact on storage and polydispersity
Giovannini, G., Kunc, F., Piras, C. C., Stranik, O., Edwards, A. A., Hall, A. J. & Gubala, V., 5 Apr 2017, In: RSC Advances. 7, 32, p. 19924-19933 10 p.

Prizes

RSC Researcher Mobility Travel Grant
Piras, C. C. (Recipient), 2020

Marie Curie Alumni Association Media Micro Grant
Piras, C. C. (Recipient), Oct 2019

Best oral presentation at SupraBio Conference - Barcelona
Piras, C. C. (Recipient), May 2019

Marie Curie Alumni Association Media Micro Grant
Piras, C. C. (Recipient), 2017

RSC travel Grant to attend the ISACS18 Conference - Challenges in Organic Materials and Supramolecular Chemistry
Piras, C. C. (Recipient), Nov 2015

Best poster prize - Life Beyond the PhD Conference - Cumberland Lodge
Piras, C. C. (Recipient), Aug 2015

University of Kent Conference Bursary to attend "Life beyond the PhD" Conference - Cumberland Lodge
Piras, C. C. (Recipient), Jul 2015

RSC Travel grant to attend the MC12 International Conference of Materials Chemistry - York
Piras, C. C. (Recipient), Jun 2015

Diamond Summer School Bursary
Piras, C. C. (Recipient), 2014

Italian Ministry of Foreign Affair Scholarship
Piras, C. C. (Recipient), Sept 2012

National Award Best Thesis in Pharmacy 2012 - Natale Ferrara Foundation (Italy)
Piras, C. C. (Recipient), 2012