

PERSONAL INFORMATION

Nikolaos I. Tsongidis

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📅 Date of birth 23 October 1990 | 🇬🇷 Nationality Greek

WORK EXPERIENCE

Jul 2022–Present
May 2014–Jul 2022

CERTH/CPERI, Collaborating Researcher
CERTH/CPERI, Research Engineer

Main activities

- Nikolaos project managed 3 EU-funded Projects and supported from a technical point of view another 9 (HEU, HORIZON2020, GSRT, FP7) including 1 ERC (European Research Council) Project
- He led the stakeholder coordination and engagement along with participating as a scientific SME in the CHORUS Cluster, focusing on the Organization's activity to attract new industrial members in the fields of clean energy, clean technologies and circular economy
- Nikolaos coordinated and prepared proposals for HEU, HORIZON2020, COSME, LIFE and others at national and European level
- He holds significant experience in knowledge exchange visits by attending >30 related Project meetings, conferences (e.g., SolarPACES, ECERS), workshops (e.g., DLR Cologne), summer and winter Schools (e.g., CNRS Odeillo and ETH Zurich) and European Automotive Research Partners Association (EARPA) meetings; Involvement in their relative deliverables and reports preparation
- His technical expertise includes:
 - Valorization of organic waste (mainly agricultural) and byproducts with the aid of solar-aided hydrothermal liquefaction technology to produce added value energy carriers
 - Development and application of synthesis, shaping, characterization and evaluation of materials in appropriate experimental setups aiming at:
 - The thermochemical energy storage through cyclic chemical reactions: i) catalytic materials based on iron (Fe_2O_3) and copper (CuO) oxides for the elemental sulfur cycle, ii) calcium oxide (CaO) based materials for the cyclic thermochemical reactions of calcium oxide/calcium carbonate (CaO/CaCO_3) and calcium oxide/calcium hydroxide ($\text{CaO}/\text{Ca}(\text{OH})_2$)
 - The production of solar fuels, primarily H_2 through water splitting via a solar-powered hybrid thermochemical-sulphur dioxide depolarized electrolysis cycle
 - Strong physicochemical characterization background, including numerous analytical techniques: Operation of bomb calorimeter, elemental analyzer, GC, TGA/DSC, Hg-Porosimetry, CS & data processing/ evaluation of XRD, FTIR, SEM/EDS, BET, PSD
 - Computational simulation of chemical processes using AspenTech Aspen Plus process engineering software, including an industrial-scale plant producing a) liquid fuels from syngas derived from H_2O and CO_2 by utilizing the Fischer-Tropsch method, and b) methanol
 - Computational Density Functional Theory (DFT) methods utilizing commercial source codes (e.g., the Vienna Ab-initio Simulation Package, VASP) for ab-initio simulations of materials design. Emphasis on spinel structures of transition and inner transition metal oxides for the improvement of the state-of-the-art material redox activity in $\text{H}_2\text{O}/\text{CO}_2$ splitting redox reactions

EDUCATION AND TRAINING

- Feb 2017–Jul 2022** **Doctor of Philosophy (PhD)**
Department of Chemical Engineering, Faculty of Engineering, AUTH
 - Supervisor: Prof. Athanasios G. Konstandopoulos, Dissertation title: *"Materials and Reactors for Solar Thermochemical Processes"*
- Sep 2008–Sep 2013** **Diploma in Chemical Engineering (Dipl. -Ing equivalent to MEng)**
Department of Chemical Engineering, Faculty of Engineering, AUTH
 - Minor degree in Materials Science; elective courses on Energy sector
- Nov 2012–Jul 2013** **Diploma Thesis**
Department of Chemical Engineering, Faculty of Engineering, AUTH
 - Diploma Thesis title "Study of cobalt oxide based small monolithic bodies for redox thermo-chemical energy storage applications"
- Oct 2012- Apr 2013** **Technical & Economic Chemical Product and Plant Design**
Department of Chemical Engineering, Faculty of Engineering, AUTH
 - Technical & Economic Chemical Product and Plant Design Project titled "Methanol Production Unit"
- Jun 2012–Jul 2012** **Materials Technology Practice Training**
Zincometal S.A.
Quality Assurance and Control Department Intern
- Sep 2005–Jun 2008** **Certificate of graduation of Senior High School**
2nd General Lyceum of Kilkis (Senior High School)
 - Top grade among his class

PERSONAL SKILLS

Mother tongue

Greek

Other languages

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C2	C2	C2	C2
Cambridge Proficiency C2 (CPE), Michigan Proficiency C2 (ECPE)					
German	B2	B2	B2	B2	B2
State Certificate of Language Proficiency B2, Goethe Institut Zertifikat B1					

B2: Independent user - C2: Proficient user

Digital competence

- Excellent knowledge of computational/simulation software AspenTech Aspen Plus, DFT ab-initio simulation source codes (e.g., VASP), COMSOL Multiphysics, SPSS. Knowledge of ANSYS Fluent and SolidWorks
- Excellent knowledge of programming languages Fortran, Mathworks MATLAB (incl. UDF). Knowledge of C, C++, Java and SQL
- Excellent knowledge of MS Office (Word, Excel, PowerPoint, Visio), OriginLab Origin

PUBLICATIONS

Peer-reviewed journals

- Agrafiotis C., Thomey D., de Oliveira L., Karagiannakis G., Tsongidis N.I., Pagkoura C., Alkan G., Roeb M., Sattler C. (2023) "Structured sulphur trioxide splitting catalytic systems and allothermally-heated reactors for the implementation of Sulphur-based thermochemical cycles via a centrifugal solar particle receiver", *Applied Catalysis B: Environmental*, 324, 122197 [DOI: <https://doi.org/10.1016/j.apcatb.2022.122197>]
- Poravou C.A., Tsongidis N.I., Lekkos C., Zacharopoulou V.A., Konstandopoulos A.G. (2022) "Valorization of Plastic Waste: A Lab-Scale Approach with the Aid of Solar Hydrothermal Liquefaction Technology", *Waste and Biomass Valorization*, 13(9), 3835-3844 [DOI: <https://doi.org/10.1007/s12649-022-01837-3>]
- Pantoleontos G., Tsongidis N.I., Daskalos E., Konstandopoulos A.G. (2021) "Development of transportation cost functions and optimization of transportation networks for solar-aided utilization of CO₂", *International Journal of CO₂ Utilization*, 112, 103528 [DOI: <https://doi.org/10.1016/j.ijggc.2021.103528>]
- Tsongidis N.I., Poravou C.A., Zacharopoulou V.A., Dimitrakis D.A., Konstandopoulos A.G. (2020) "Valorization of organic waste with the aid of solar hydrothermal liquefaction technology", *AIP Conference Proceedings*, 2303 [DOI: <https://doi.org/10.1063/5.0028774>]
- Tsongidis N.I., Karagiannakis G., Sakellariou K.G., Pagkoura C., Konstandopoulos A.G. (2019) "Iron Oxide-based Particles For High Temperature Thermochemical Energy Storage Via The Elemental Sulfur Thermochemical Cycle", *AIP Conference Proceedings*, 2126 [DOI: <https://doi.org/10.1063/1.5117758>]
- Tsongidis N.I., Asimakopoulou A., Pantoleontos G., Konstandopoulos A.G. (2018) "Transportation and solar-aided utilization of CO₂: Technoeconomic analysis of spanning routes of CO₂ conversion to solar fuels", *International Journal of CO₂ Utilization*, 30, pp. 142-157 [DOI: <https://doi.org/10.1016/j.ijcou.2019.01.010>]
- Agrafiotis C., Thomey D., de Oliveira L., Happich C., Roeb M., Sattler C., Tsongidis N.I., Sakellariou K.G., Pagkoura C., Karagiannakis G., Konstandopoulos A.G., Pomykalska D., Zagaja M., Janus D. (2018) "Oxide particles as combined heat storage and sulphur trioxide decomposition catalysts for solar hydrogen production through sulphur cycles", 44 (20), pp. 9830-9840 [DOI: <https://doi.org/10.1016/j.ijhydene.2018.11.056>]
- Lemontzoglou A., Pantoleontos G., Asimakopoulou A.G., Tsongidis N.I., Konstandopoulos A.G. (2017) "Analysis of CO₂ transport including impurities for the optimization of point-to-point pipelines networks for integration into future solar fuel plants", *International Journal of Greenhouse Gas Control*, 66, pp. 10-24 [DOI: <https://doi.org/10.1016/j.ijggc.2017.09.011>]
- Sakellariou K.G., Criado Y.A., Tsongidis N.I., Karagiannakis G., Konstandopoulos A.G. (2017) "Multi-cyclic evaluation of composite CaO-based structured bodies for thermochemical heat storage via the CaO/Ca(OH)₂ reaction scheme", *Solar Energy*, 146, pp. 65-78 [DOI: <http://dx.doi.org/10.1016/j.solener.2017.02.013>]
- Sakellariou K.G., Tsongidis N.I., Karagiannakis G., Konstandopoulos A.G. (2017) "Shortlisting of composite CaO-based structured bodies suitable for thermochemical heat storage with the CaO/Ca(OH)₂ Reaction Scheme", *Energy and Fuels*, 31 (6), pp. 6548-6559 [DOI: <http://dx.doi.org/10.1016/j.solener.2017.02.013>]
- Obermeier J., Sakellariou K.G., Tsongidis N.I., Baciú D., Charalambopoulou G., Steriotis T., Müller K., Karagiannakis G., Konstandopoulos A.G., Stubos A., Artl W. (2017) "Material development and assessment of an energy storage concept based on the CaO-looping process", *Solar Energy*, 150, pp. 298-309 [DOI: <http://dx.doi.org/10.1016/j.solener.2017.04.058>]
- Dimitrakis D.A., Tsongidis N.I., Konstandopoulos A.G. (2016) "Reduction enthalpy and charge distribution of substituted ferrites and doped ceria for thermochemical water and carbon dioxide splitting with DFT+U", *Phys. Chem. Chem. Phys.* 18 (34), pp. 23587-23595 [DOI: <http://dx.doi.org/10.1039/C6CP05073E>]
- Sakellariou K.G., Tsongidis N.I., Karagiannakis G., Konstandopoulos A.G., Baciú D., Charalambopoulou G., Steriotis T., Stubos A., Artl W. (2016) "Development and evaluation of materials for thermochemical heat storage based on the CaO/CaCO₃ reaction couple", *AIP Conference Proceedings*, 1734, 050040 (1-9) [DOI: <https://doi.org/10.1063/1.4949138>]

Conference posters/oral presentations

- Tsongidis N.I., Poravou, C.A., Zacharopoulou V.A., Dimitrakis D.A., Zygogianni A., Konstandopoulos A.G., "Plastic waste valorization with solar-aided hydrothermal liquefaction technology", *SolarPACES International Conference 28 September – 2 October 2020*, online conference
- Tsongidis N.I., Poravou C.A., Zacharopoulou V.A., Dimitrakis D.A., Konstandopoulos A.G., "Valorization of organic waste with the aid of solar hydrothermal liquefaction technology", *SolarPACES International Conference 1-4 October 2019*, Seoul, South Korea
- Tsongidis N.I., Lorentzou S., Karagiannakis G., Sakellariou K.G., Pagkoura C., Zygogianni A., Syrigou M., Dimitrakis D., Kostoglou M., Konstandopoulos A.G., "Materials for Solar Energy Storage Applications", *Sun-to-Liquid Workshop 10-11 October 2018*, Mostoles, Spain
- Tsongidis N.I., Karagiannakis G., Sakellariou K.G., Pagkoura C., Konstandopoulos A.G., "Iron Oxide-based Particles for High Temperature Thermochemical Energy Storage via the Elemental Sulfur Thermochemical Cycle", *SolarPACES International Conference 2-5 October 2018*, Casablanca, Morocco
- Karagiannakis G., Tsongidis N.I., Sakellariou K.G., Pagkoura C., Janus D., Zagaja M., Pomykalska D., "Development, evaluation & characterization of composite materials for thermochemical sulfur storage cycle in CSP plants", *iSEnEC 2018*, 17-18 July 2018, Nurnberg, Germany
- Sakellariou K.G., Tsongidis N.I., Pagkoura C., Karagiannakis G., Konstandopoulos A.G., "Development of catalytic particles for SO₃ decomposition of the thermochemical storage scheme based on elemental sulfur", *2nd NESTER Autumn School on Concentrated Solar Technologies*, 6-16 November 2017, Nicosia, Cyprus
- Tsongidis N.I., Karagiannakis G., Sakellariou K.G., Pagkoura C., Konstandopoulos A.G., Janus D., Zagaja M., Pomykalska D., "Composite particles as active catalysts for the SO₃ dissociation reaction of the thermochemical storage scheme based on elemental sulphur", *SolarPACES International Conference*, 26-29 September 2017, Santiago, Chile

Curriculum vitae

- Sakellariou K.G., Tsongidis N.I., Pagkoura C., Karagiannakis G., Konstandopoulos A.G., "Materials and Reactors for Thermochemical Energy Storage", European Congress and Exhibition on Advanced Materials and Processes, 17-22 September **2017**, Thessaloniki, Greece
- Tsongidis N.I., Sakellariou K.G., Karagiannakis G., Pagkoura C., Konstandopoulos A.G., "Composite particles as active catalysts for the SO₃ dissociation reaction of the thermochemical storage scheme based on elemental sulphur", International Workshop on Solar Thermochemistry, 12-14 September **2017**, Jülich, Germany
- Karagiannakis G., Pagkoura C., Sakellariou K.G., Tsongidis N.I., Lorentzou S., Konstandopoulos A.G., "The challenge of optimum combination between reactivity and cyclic structural stability of thermochemical storage systems and a strategy towards this goal", International Workshop on Solar Thermochemistry, 12-14 September **2017**, Jülich, Germany
- Tsongidis N.I., Dimitrakis D., Syrigou M., Lorentzou S., Kostoglou M., Karagiannakis G., Konstandopoulos A.G., "Materials for thermochemical redox reactions: Computational chemistry, experiments and simulation", 21st International Solid State Ionics Conference, 18-23 June **2017**, Padova, Italy
- Karagiannakis G., Lorentzou S., Sakellariou K., Tsongidis N.I., Pagkoura C., Konstandopoulos A.G., "Structured active materials for thermochemical energy storage", 12th Pacific Rim Conference on Ceramic and Glass Technology, 21-26 May **2017**, Waikoloa, Hawaii, USA
- Sakellariou K.G., Tsongidis N.I., Criado, Y.A., Karagiannakis G., Abanades C.J., Konstandopoulos A.G., "Development and evaluation of CaO-based materials for thermochemical energy storage based on the CaO/Ca(OH)₂ reaction couple", SolarPACES, 11-14 October **2016**, Abu Dhabi, UAE
- Karagiannakis G., Sakellariou K.G., Tsongidis N.I., Konstandopoulos A.G., Baciu D., Charalambopoulou G., Steriotis T., Stubos A., Obermeier J., Müller K., Arlt W., "A novel concept for solar-aided thermochemical energy storage & transportation based on CaO-looping: the NESTOR project", iSEneC, 11-12 July **2016**, Nuremberg, Germany
- Tsongidis N.I., Dimitrakis D.A., Konstandopoulos A.G., "A first-principles study on oxygen vacancy formation at Zr-doped CeO₂ catalytic systems", APT-STEP Workshop 2 on "Novel Material Technologies for Alternative Powertrains", 25-26 February **2016**, Thessaloniki, Greece
- Sakellariou K.G., Tsongidis N.I., Karagiannakis G., Konstandopoulos A.G., Baciu D., Charalambopoulou G., Steriotis T., Stubos A., Obermeier J., Müller K., Arlt W., "A Novel Energy STORage and transportation concept based on concentrated solar irradiation-aided CaO-looping", Greek-German Days on Research, Innovation & Young Scientists, 9-10 December **2015**, Athens, Greece
- Sakellariou K.G., Tsongidis N.I., Karagiannakis G., Konstandopoulos A.G., Baciu D., Charalambopoulou G., Steriotis T., Stubos A., Arlt W. "Development and evaluation of materials for thermochemical heat storage based on the CaO/CaCO₃ reaction couple", SolarPACES International Conference, 13-16 October **2015**, Cape Town, South Africa
- Sakellariou K.G., Tsongidis N.I., Karagiannakis G., Konstandopoulos A.G., "Thermochemical Heat Storage with the aid of CaO-based materials via cyclic carbonation-calcination" 14th International Conference of the European Ceramic Society, 21-25 June **2015**, Toledo, Spain