



## Smartphone analysers for on-site testing of food quality and safety

Issue 9 – December 2021



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### Welcome to the final FoodSmartphone e-Newsletter!

Dear reader and FoodSmartphone follower,

Based on the Marie Curie contract, the FoodSmartphone project ended already on April 1<sup>st</sup>, 2021. All final reporting was done in time and the project has been favourably reviewed by the EC. Fortunately, thanks to local funding, the later recruited ESRs 12, 17 and 19 could continue their research projects in 2021. When writing this newsletter, many of us would have hoped the covid-19 pandemic being under control. In reality, the situation turned out much harder to predict and is still affecting our researchers in their final project year. Despite all this, again a high number of high impact research papers has been published by our ESRs, and three of our ESRs successfully defended their PhD theses in 2021. Several other ESRs are currently drafting a PhD thesis and looking forward to their graduation.

You may wonder what will happen after the end of FoodSmartphone. Of course the FoodSmartphone website will remain active and regularly updated with the latest open access research papers and PhD theses on the dissemination pages. As expected, the novel prototype solutions from the project are at a technology readiness level 3-4, waiting for further development into truly exploitable products. But please note, the first examples of local and (inter)national follow-up activities are quoted in this newsletter. Of course the most important heritages of the project are the ESRs: a new generation of multi-disciplinary trained young scientists capable of integrating the future testing requirements into portable devices that will eventually fulfil our slogan, 'Yes You Can Do Food Testing'. For me, as a coordinator being close to his retirement, that's absolutely the best I could get from the project.

For now, Ingeborg and I wish you some well-deserved Christmas holidays and all the best for a healthy and meaningful 2022!



Michel Nielen

## FoodSmartphone progress versus research objectives

### Key facts:

**Grant Agreement:**  
720325 –

FoodSmartphone -  
H2020-MSCA-ITN

**Start date:**

January 2017

**Duration:** 51 months

**Volume:** 2.8 M€

### Coordinator:

Prof. Michel Nielen, PhD  
Wageningen Food Safety  
Research, Wageningen  
University & Research  
Wageningen, NL

### Website:

[www.foodsmartphone.eu](http://www.foodsmartphone.eu)

### Twitter:

@FoodSmartphone

### YouTube:

IXceX3TITzs



The major science and innovation gaps addressed by the FoodSmartphone project related to high-speed and novel biorecognition of food contaminants, novel optical and electrochemical detection schemes in conjunction with smartphones, simplified microfluidic sample handling solutions that enable non-expert operation, advanced software architectures, and the development of application demonstrators for food quality and safety issues of concern, viz. for antibiotics, pesticides, allergens, mycotoxins, food spoilage and marine toxins. Despite the continuing covid-19 situation, hampering face-to-face collaborations and secondments, a number of research and review papers are in the pipeline while the following published papers have been added recently to our [website](#):

- ESRs 11, 17, 12, 6 and 3 jointly wrote a review paper entitled "ASSURED point-of-need food safety screening: a critical assessment of portable food analyzers", which appeared in *Foods*, 10 (2021) 1399 (doi.org/10.3390/foods10061399).
- ESR12, Ariadni Geballa-Koukoulou, wrote a research paper entitled "From smartphone lateral flow immunoassay screening to direct MS analysis: development and validation of a semi-quantitative direct analysis in real-time mass spectrometric (DART-MS) approach to the analysis of deoxynivalenol", which appeared in *Sensors*, 21 (2021) 1861 (doi: 10.3390/s21051861).
- ESR3, Jordi Nelis, wrote a research paper entitled "Highly sensitive electrochemical detection of the marine toxins okadaic acid and domoic acid with carbon black modified screen printed electrodes", which appeared in *Talanta*, 228 (2021) 122215 (doi: 10.1016/j.talanta.2021.122215).

#### WP1 leader

M.-Pilar Marco (CSIC)

#### WP2 leader

Gert Salentijn (WFSR)

#### WP3 leader

Jens Eriksson (LIU)

#### WP4 leader

Karen Rafferty (QUB)

#### WP5 leader

Jana Hajslova (UCT)

#### WP6 leader

Katrina Campbell (QUB)

#### WP7 leader

Jana Pulkrabova (UCT)

#### WP8 leader

Michel Nielen (WFSR)

- ESR3 also wrote a research paper entitled "A plasmonic biosensor array exploiting plasmon coupling between gold nanorods and spheres for domoic acid detection via two methods", which appeared in *Spectrochim. Acta Part A*, 252 (2021) 119473 (doi:10.1016/j.saa.2021.119473).
- ESR4, Javier Lou Franco, co-authored a research paper entitled "Catalytic gold nanostars for SERS-based detection of mercury ions (Hg<sup>2+</sup>) with inverse sensitivity", which appeared in *Environmental Science: Nano*, 2021. (doi: 10.1039/D1EN00548K).
- ESR4 also co-authored a review paper entitled "Nanozymes in point-of-care diagnosis: an emerging futuristic approach for biosensing", which appeared in *Nano-Micro Letters*, 13 (2021) 193 (doi.org/10.1007/s40820-021-00717-0).
- ESR5, 4 and 3 jointly wrote a research paper entitled "Smartphone modulated colorimetric reader with color subtraction", which appeared in *IEEE Sensors*, (2019) 1-4 (doi: 10.1109/SENSOR43011.2019.8956565).
- ESR6, Aris Tsagkaris, wrote a review paper entitled "Optical screening methods for pesticide residue detection in food matrices: advances and emerging analytical trends", which appeared in *Foods*, 10 (2021) 88 (doi:10.3390/foods10010088).
- ESR12, Ariadni Geballa-Koukoura, wrote a research paper entitled "Immuno-enriched microspheres - magnetic blade spray-tandem mass spectrometry for domoic acid in mussels", which appeared in *Anal.Chem.*, 93 (2021) (doi:10.1021/acs.analchem.1c03816).

## FoodSmartphone doctorates for Gina, Klaudia and Andriy



One of the key aims of an initial training network such as FoodSmartphone is to provide PhD training. On March 12<sup>th</sup> 2021, ESR1 Gina Ross successfully defended her PhD thesis entitled "From sample to smartphone, consumer-operable analytical devices for multiplex allergen detection" at Wageningen University. Her thesis received the designation *cum laude*, which is only awarded to the top 3% of all theses at that university. ESR8, Klaudia Kopper, successfully defended her thesis entitled "Electrochemical immunosensors for pesticide residue detection in food matrices" at the University of Barcelona on November 26<sup>th</sup>, 2021. On June 2021, our former ESR10 Andriy Kuzmyn successfully defended his PhD thesis entitled "The light way towards bioactive and antifouling coatings" at Wageningen University. More FoodSmartphone PhD thesis defences are expected to come up soon. Congrats to all our young doctors and their supervisors! A pdf copy (or link) of the Foodsmartphone PhD theses can be found in the PhD Thesis tab on our web page [http://foodsmartphone.eu/dissemination\\_materials.html](http://foodsmartphone.eu/dissemination_materials.html).



## FoodSmartphone follow-up quotes

A Marie-Curie ITN aims for a final technology readiness level of 3-4, i.e. proof-of-concepts and in-house validation. Follow-up activities are crucial and already emerging: "FoodSmartPhone layed the foundation for on-site food allergen testing by caterers" [public-private partnership project, Nathalie Smits]. "FoodSmartphone experience has massively boosted my career, now having a position as assistant prof at VSCHT and exploiting my skills in the new H2020 Papillons project" [former ESR6, Aris Tsagkaris]. "The FoodSmartphone heritage has been adopted to develop a fipronil dipstick assay along with a 3D printed cartridge and clip for standard smartphone reading" [government-funded statutory tasks project, Toine Bovee].

## Forthcoming events / meetings



### [EuroFAST2022](#)

19-22 April 2022, live event, Nijmegen, The Netherlands

### [Recent Advances in Food Analysis \(RAFA2022\)](#)

2-5 November 2022, live event, Prague, Czech Republic

## Contact us

✉ [foodsmartphone@foodsmartphone.eu](mailto:foodsmartphone@foodsmartphone.eu)

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🐦 [@FoodSmartphone](https://twitter.com/FoodSmartphone)



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