

## CURRICULUM VITAE ABREVIADO (CVA)

### Part A. PERSONAL INFORMATION

First name	Jesús Alberto		
Family name	Escarpa Miguel		
Gender (*)	Male	Birth date (dd/mm/yyyy)	
ID number			
e-mail	alberto.escarpa@uah.es	URL Web	
Open Researcher and Contributor ID (ORCID) (*)	0000-0002-7302-0948		

#### A.1. Current position

Position	Full Professor of Analytical Chemistry		
Initial date	15/12/2017		
Institution	Universidad de Alcalá (UAH)		
Department/Center	Analytical Chemistry, Physical Chemistry and Chemical Engineering, Faculty of Sciences		
Country	Spain	Teleph. number	
Key words	Analytical miniaturization and nanotechnology, nanomaterials for optical and electrochemical (bio)-sensing, electrochemical microfluidics, lab-on-a-chip technology, micromotors		

#### A.2. Previous positions (research activity interruptions, indicate total months)

Period	Position/Institution/Country/Interruption cause
19/10/2001-14/12/2017	Associate profesor (Titular de Universidad)
04/10/1996-03/10/2001	Ayudante Universidad Química Analítica
01/03/1995-30/09/1996	Prof. Asociado de Química Analítica

#### A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Chemistry Degree	Universidad de Alcalá	1993
PhD in Chemistry	Universidad de Alcalá	1998

### Part B. CV SUMMARY

**Dr. Alberto Escarpa** is a Full Professor of Analytical Chemistry at the University of Alcalá (UAH). He is the leader and founder (in 2003) of the “Analytical Miniaturization and Nanotechnology” (MINYNANOTECH) research group. His main research interests are designing and developing nanomaterials-based (bio)sensors, electrochemical microfluidics, lab-on-a-chip/organ-on-chip technologies, and artificial micromotors. He has co-authored more than 200 articles in leading international peer-reviewed journals, 6 patents, and 11 book chapters, yielding an h-index of 56. He has recently been included in the top 2% (1% position in the ranking) of the most cited chemists in the world by Stanford University (2020-2023) and he has been awarded with the Spanish Royal Society of Chemistry Award for Research Excellence 2024. His works have been highlighted several times in top journals such as *Angewandte Chemie International Edition*, *Chemical Science*, *Analytical Chemistry*, and *Lab on a Chip* and social media (Chemical World, RSC; Separations Now, Wiley and C&EN news ACS, Nanowerk). He has edited and authored several books including “Miniaturization of Analytical Systems: principles, designs, and applications” (Wiley, 2009), “Food Electroanalysis” (2015, Wiley), and “Carbon-based Nanomaterials in Analytical Chemistry” (RSC, 2018). He is a member of the Editorial Board of *Analytical Chemistry*, *Analysis & Sensing*, *Applied Materials Today*, *Journal of Nanobiotechnology*, and *Electrophoresis*. He has been Associate Editor for *RSC Advances* (2015-2019) and Associate Editor (2018-2019) for *Microchimica Acta*. Since 2019, he has been *Editor in Chief* for *Microchimica Acta*. He has given more than 50 invited lectures at the most prestigious forums of micro and analytical nanotechnologies. He has been also involved in transferring scientific knowledge to society through the organization of several activities such as *Semana de la Ciencia* and *European*

Research Night, Madrid. He has received several awards such as the NATO Fellowship to perform postdoctoral research at the New Mexico State University (USA) in 2001, the "Young Investigator Award" by the University of Alcalá in 2003, the International Dropsens Award for "Best Research Work in applied electroanalytical chemistry" (finalist) in 2015. He served as a visiting professor in international Universities and research centers such as the University of California San Diego (USA) and the International Center for Young Scientists in the National Institute for Materials Science (Tsukuba, Japan). He has also been a visiting professor at Buenos Aires University. He is currently a scientific partner at Nanorobots Research Center (Prague, Czech Republic) and a visiting professor at Prince of Songkhla University (Thailand). Prof. Escarpa is also a member of the Collegium of the Ph.D. in Food Science at Teramo University (Italy). He has also supervised 20 Doctoral Thesis (15 with International Mention) with 20 awards and honors (12 Extraordinary Awards, 6 Awards for the Best Thesis in Chemistry of the RSEQ-STM, 1 Lilly-RSEQ 2020, 1 National Award for the best Thesis of Health Sciences of Funcas, 4 Award for the Best Thesis of the Society of Condueños). The "Excellence Award in Doctoral Thesis Supervision of Sciences in 2021" award has recognized such excellent mentoring activity at the University of Alcalá, proving the excellent involvement and dedication of Dr. Escarpa for the training of young researchers. He has supervised two Juan de la Cierva Postdoctoral researchers, and several upcoming Ph.D. students from around the world. Former Ph.D. students of his group hold positions as Associate or Assistant Professors in Spanish Universities. Since 2018, he has been a collaborator of the Spanish State Research Agency, CTQ (Chemistry) area of the Coordination, Evaluation, and Technical Scientific Monitoring Division.

## Part C. RELEVANT MERITS

### C.1. Publications (*all as corresponding author concerning both research lines involved in the proposal: microfluidics (1-4) and micromotors (5-10), see CV summary*)

1. J.F. Hernández-Rodríguez, D. Rojas\*, **A. Escarpa\***. Print-Pause-Print fabrication of tailored electrochemical microfluidic devices. *Anal. Chem.*, 95, **2023**, 18679. Impact factor (IF): 7.4. Rank (Chemistry, Analytical): 7/86 (Q1). **Open access**
2. J.F. Hernández-Rodríguez; D. Rojas\*; **A. Escarpa\*** Electrochemical fluidic fused filament fabricated devices (eF4D): In-channel electrode activation. *Sens. Actuators B Chem.*, 393, **2023**, 134290. Impact factor (IF): 8.4. Rank (Chemistry, Analytical): 5/86 (Q1). **Open access**
3. S. Dorte, N. DeGregorio-Rocasolano, M. Millán, T. Gasull, A. G. Crevillen\*, and **A. Escarpa\***. Paper-based analytical devices for accurate assessment of transferrin saturation in diagnosed clinical samples from ischemic stroke patients. *Anal. Chem.*, 95, **2023**, 12391. IF: 7.4. Rank (Chemistry, Analytical): 7/86 (Q1). *Highlighted as cover*. **Open access**
4. J.F. Hernández-Rodríguez, M.A. López, D. Rojas\*, **A. Escarpa\***. Digital manufacturing for accelerating organ-on-a-chip dissemination and electrochemical biosensing integration. *Lab Chip.*, 22, **2022**, 4805. IF: 6.1. Rank (Chemistry, Analytical): 9/86 (Q1) (*Invited contribution*).  
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5. C. Cuntín-Abal, J. Bujalance-Fernández, K. Yuan, A. Arribi, B. Jurado-Sánchez\*, **A. Escarpa\***. Magnetic bacteriophage-engineered Janus micromotors for selective bacteria capture and detection. *Adv. Function. Mater.*, **2024**, DOI: 10.1002/adfm.202312257. IF: 19. Rank (Chemistry, Multidisciplinary): 8/178 (Q1). **Open access**
6. J. M. Gordón-Pidal, M. Moreno-Guzmán, A. Montero-Calle, A. Valverde, J. M. Pingarrón, S. Campuzano\*, M. Calero, R. Barderas\*, M.A. López\*, **A. Escarpa\***. Micromotor-based electrochemical immunoassays for reliable determination of amyloid- $\beta$  (1–42) in Alzheimer's diagnosed clinical samples. *Biosens. Bioelectron.*, 249, **2024**, 115988. IF: 12.6. Rank (Chemistry, Analytical): 2/86 (Q1). **Open access**
7. J.M. Gordón-Pidal, L. Arruza, M. D. Ibáñez, M. Moreno-Guzmán, M.A. López\*, **A. Escarpa\***. On the move-sensitive fluorescent aptassay on board catalytic micromotors for the determination of Interleukin-6 in ultra-low serum volumes for neonatal sepsis

diagnostics. ACS Sens. 7, **2022**, 3144. IF: 8.9. Rank (Chemistry, Analytical): 4/86 (Q1).

**Open access**

8. V. de la Asunción-Nadal, C. Franco, A. Veciana, S. Ning, A. Terzopoulou, S. Sevim, X.-Z. Chen, D. Gong, J. Cai, P. D. Wendel-Garcia, B. Jurado-Sánchez, **A. Escarpa**,\* J. Puigmartí-Luis, S. Pané\*. MoSBOTs: magnetically driven biotemplated MoS<sub>2</sub>-based microrobots for biomedical applications. Small 18, **2022**, 2203821. IF: 13.3. Rank (Chemistry, Multidisciplinary): 23/230 (Q1). **Open access**
9. R. María-Hormigos, A. Molinero-Fernández, M. A. López, B. Jurado-Sánchez\*, **A. Escarpa**\*. Prussian Blue/Chitosan micromotors with intrinsic enzyme-like activity for (bio)-sensing assays. Anal. Chem. 94, **2022**, 5575. IF: 7.4. Rank (Chemistry, Analytical): 7/86 (Q1). **Open access**
10. K. Yuan, B. Jurado-Sánchez\*, **A. Escarpa**\* Dual-propelled lanibiotic based Janus micromotors for selective inactivation of bacteria biofilms. Angew. Chem. Int. Ed., 60, **2021**, 4915. IF: 15.336. Rank (Chemistry, Multidisciplinary): 16/178 (Q1).

**C.2. Congress** (*all of them selected Keynote or Plenary conferences as an invited speaker*)

1. **A. Escarpa**. Micromotors in nanomedicine: biosensing on the fly for clinical diagnosis. 8th Thailand International Nanotechnology Conference (NanoThailand 2023). Pattaya (Thailand), November 29-December 1, 2023 (*Keynote*).
2. **A. Escarpa**, B. Jurado, M.A. López. Micro swimmers-based collective biosensing for in vitro diagnosis: what is next? Nanobalkan2023 International Conference. Tirana, Albany, October 16-20, 2023 (*Keynote*).
3. **A. Escarpa**, J.M. Gordon, L. Arruza, M. Moreno, M.A. López. On-the-fly aptassays for neonatal sepsis diagnosis. 13th International Conference on Instrumental Methods of Analysis: Modern Trends and Applications. Chania-Crete (Greece), September 17-20, 2023 (*Oral Invited*).
4. **A. Escarpa**, B. Jurado, M.A. López. Catalytic micromotors in action for (bio)sensing applications. 4th European Biosensor Symposium. Aachen (Germany), August 27-30, 2023 (*Keynote*).
5. **A. Escarpa**, B. Jurado. Micromotors in action as environmental micro-cleaners: just a concept or a futuristic reality? 25th International Symposium on Advances in Extraction Technologies (ExTech2023). Tenerife (Spain), July 18-21, 2023 (*Keynote*).
6. **A. Escarpa**. Tailored electrochemical microfluidics for bioanalysis. Physics and Chemistry of Microfluidics Gordon Research Conference. Microscale Systems: From Physical Phenomena to Biological Applications. Lucca (Italy), June 4 - 9, 2023 (*Invited*).
7. **A. Escarpa**, B. Jurado, M. A. López. Micromotors in action: smart microsensors swimming in a concept or a futuristic reality? 18TH IEEE International Conference on Nano/Micro Engineered and Molecular Systems, Jeju (Korea), May 14-17, 2023 (*Keynote*).
8. **A. Escarpa**, Electrochemical (bio)sensing in micro-size environments. 10<sup>th</sup> ElecNano. París (France), May 10-12, 2023 (*Plenary*).
9. **A. Escarpa**, D. Rojas, J.F. Hernández-Rodríguez, J. Bañó. Electrochemical Detection for Low-Cost Fabrication of Microfluidic Devices. Towards the Measurement of Biochemical Reactions in Cell Cultures. 27th Latin American Capillary Electrophoresis–LACE 2022. Panama City (Panama), December 03-06, 2022 (*Keynote*).
10. **A. Escarpa**. Micromotors for (bio)-sensing and environmental applications: exploring their collective behavior. XXIX Congress of the Division of Analytical Chemistry of the Italian Chemical Society. Milazzo (Italy) September 11-15, 2022 (*Plenary*).

**C.3. Research projects** (*all of them as Principal Investigator, PI*)

1. **Title and Reference:** Innovative micromotor-based strategies for the removal of antibiotics and bacterial biofilms for safe water reuse (TED2021-132720B-I00). Funding Institution: Ministerio de Ciencia e Innovación, Proyectos de Transición Ecológica y Digital 2021. **PIs:** **A. Escarpa** and B. Jurado. From/to: 01/12/2022-30/11/2024. Budget: 161.000 €
2. **Title and Reference:** Innovative (bio)--sensing approaches based on electrochemical microfluidics and artificial micromotors for clinical biomarkers analysis (PID2020-

118154GB-I00). Funding Institution: Ministerio de Ciencia e Innovación. **PIs:** **A. Escarpa** and B. Jurado. From/to: 01/09/2021-31/08/2024. Budget: 217.800 € and FPI fellowship associated with the project.

3. **Title and Reference:** Nanostructured (bio)-sensed "sample-to-result" platforms for latest-generation applications in clinical and food safety (S2018/NMT-4349). Funding Institution: Community of Madrid, TRANSNANOAVANSENS program involving University of Alcalá (Coordination Institution, 1), Complutense University of Madrid (1), Autonomy University of Madrid (3), and ICMM-CSIC. **PI and coordinator:** **A. Escarpa**. From/to: 01/01/2019 to 31/12/2022. Budget: 693.450 €.
4. **Title and Reference:** Development of a multi-organ microfluidic chip platform for the in vitro study of neurodegenerative diseases (Y2020/NMT-6312 NEURO-CHIP-CM). Funding Institution: Community of Madrid, Synergy grant. **PI and coordinator:** **A. Escarpa**. From/to: 01/07/2021 to 31/06/2024. Budget: 667.700 €.
5. **Title and Reference:** Micro motors-based device for early diagnosis of late-onset sepsis in very low birth weight neonates Funding Institution: Caixa Capital Risk. Obra Fundacion la Caixa. Caixa Impulse 2017 Program. **PI:** **A. Escarpa**. From/to: 01/11/2017 to 31/12/2020. Budget: 70.000 €.
6. **Title and Reference:** Analytical ultra-miniaturization on-chip and on-drop based on tubular micromotors autopropulsed by a chemical reaction and thermodiffusion effect (CTQ2017-86441-C2-1-R). Funding Institution: Ministerio de Economía y Competitividad. **PI:** **A. Escarpa**. From/to: 01/01/2018 to 31/12/2020. Budget: 141.000 € and FPI fellowship associated with the project.
7. **Title and Reference:** Labs-on-a-chip integrating nanomaterials and self-propelled molecular machines: new electroanalytical platforms for neonatal clinical diagnosis (CTQ2014-58643-R). Funding Institution: Ministerio de Economía y Competitividad. **PI:** **A. Escarpa**. From/to: 01/01/2015 to 31/12/2017. Budget: 110.000 € and FPI fellowship associated with the project.
8. **Title and Reference:** New nanotechnologies for the design and development of biosensor platforms for clinical applications, NANOAVANSENS S2013/MIT-3029. Funding Institution: Community of Madrid, NANOAVANSENS program involving University of Alcalá (1), Complutense University of Madrid (Coordination Institution, 1), Autonomy University of Madrid (3), and ICMM-CSIC. **PI (in UAH):** **A. Escarpa**. From/to: 01/01/2014 to 31/09/2018. Budget: 110.034 €.

#### C.4. Contracts, technological, or transfer merits

1. **Inventors:** L. García Carmona, A. Martín, J. Sempionatto, M.C. González, **A. Escarpa**, J. Wang. **Application number:** 35894506. **Title:** Pacifier sensor for biomarker monitoring. **Applicant:** University of Alcalá/UCSD. **Country:** Spain/USA.
2. **Inventors:** **A. Escarpa**, M.C. González, L. García Carmona, M. Moreno Guzmán. **Application number:** P201700139. **Title:** Portable device for the detection, diagnosis, and monitoring of tyrosinemia. **Applicant:** University of Alcalá. **Country:** Spain (Awarded best patent from the University of Alcalá in 2019).
3. **Inventors:** A. Martín, **A. Escarpa**. **Application number:** ES 2554203 B2. **Title:** Disposable electrodes based on filtered conductive nanomaterials. **Applicant:** University of Alcalá. **Country:** Spain. (*Best national patent award (accessit) from the University of Alcalá*)
4. **Inventors:** T. Sierra Gómez, A. Gonzalez-Crevillén, **A. Escarpa**. **Application number:** ES2893261B2 35894506. **Title:** Procedimiento para determinar el grado de glicosilación de la transferrina y equipo electroquímico para llevar a cabo dicho procedimiento. **Applicant:** University of Alcalá/UNED. **Country:** Spain. (*Best national patent award from the University of Alcalá*)