

## **Alberto Chighine, MD, PhD**

Department of Medical Sciences and Public Health, UNICA

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### **Education**

*PhD in Molecular and Translational Medicine*, University of Cagliari, Cagliari, Italy

- Dissertation: "Metabolomic Investigation of Post-Mortem Human Pericardial Fluid"
- Supervisor: Prof. Ernesto d'Aloja
- Completed: February 2025

*Specialization in Legal Medicine*, University of Cagliari, Cagliari, Italy | 2016-2020

- February-May 2020: training period at the Instituto Nacional de Medicina Legal e Ciencias Forenses, Coimbra, Portugal, at its Coimbra (Delegação do Centro) and Porto (Delegação do Norte) branches. Activities primarily focused on autopsy procedures and forensic toxicology laboratory work.
- Thesis: "Metabolomics Insights on Mechanical Asphyxia: An Animal Model"
- Grade: 50/50 cum laude

*MD, Medicine and Surgery*, University of Cagliari, Cagliari, Italy

- Thesis: "Pilot Study on an Animal Model of Violent Mechanical Asphyxia Using Metabolomics"
- Grade: 110/110 cum laude
- Completed: November 2014

### **Professional Experience**

*Tenure Track Researcher (Ricercatore a tempo determinato di tipo Tenure Track, SSD MEDS-25/A)*, Legal Medicine, University of Cagliari & AOU Cagliari, Italy | Dec 2024-Present

*National Scientific Qualification for Associate Professor (06/M2 - Legal Medicine and Occupational Medicine)* | valid from 2023 to 2034

*Research Fellow (Assegnista di Ricerca)*, Legal Medicine (SSD MED/43), University of Cagliari, Cagliari, Italy | 2021-2024

- Consulting in ethical and medico-legal support for spontaneous research projects from Medical Sciences and Public Health Department UNICA researchers, ensuring compliance with Independent Ethics Committee standards.

*Consultant and Expert Witness, Public Prosecutors' Offices and Courts*, Sardinia, Italy | 2020-Present

- Provide medico-legal evaluations in criminal (autopsies, toxicology) and civil (medical malpractice, personal injury) cases.
- Serve as court-appointed expert (CTU) for Cagliari Ordinary Court and Court of Appeal.

*Clinical Risk Management Consultant*, Madonna del Rimedio Clinic, Oristano, Italy | 2023-Present

- Advise on risk management strategies under a third-party contract with UNICA Medical Sciences and Public Health Department.

*Registered with the Order of Physicians and Dentists of the Province of Cagliari*, Italy (#9906, issued February 24, 2015).

### **Grants and Awards**

*AAFS Pathology/Biology Research Grant* (\$3,000), American Academy of Forensic Sciences | 2025

- Co-recipient with Milroy, Parai, d'Aloja, Locci for "Metabolomics Analysis of Vitreous and Pericardial Fluid in Alcohol Use Disorder and Opioid Toxicity."

Erasmus+ MOSTA Fellowships | Competitive grant for research and teaching on forensic metabolomics (8 hours of lectures given per year):

- 2023 - University of Ljubljana, Slovenia
- 2024 - Institut Médico-Légal, Paris, France
- 2025 - Institut Médico-Légal, Paris, France

Società Italiana di Medicina legale e delle Assicurazioni (SIMLA) "Antonio Osculati Award", SIMLA 44th National Congress, Italy | 2021

- For poster "Influenza della temperatura ambientale e della posizione delle palpebre nel determinismo delle modificazioni corneali in intervalli post-mortem precoci ed intermedi. Studio preliminare tramite Optical Coherence Tomography su un campione di 4 cadaveri" (co-author).

Società Italiana di Medicina legale e delle Assicurazioni (SIMLA) "Special Mention Award", SIMLA 43rd National Congress, Italy | 2018

- For poster "Metabolomics improves differential diagnosis in an animal model of mechanical asphyxia" (presenting author).

"Excellent Poster Presentation Award", 1st International Caparica Conference in Translational Forensics, Portugal | 2017

- For poster "Metabolomics signature reveals distinctive patterns in an animal model of mechanical asphyxia and dysrhythmic cardiac arrest" (presenting author).

## Publications

1. Chighine A, Stocchero M, De-Giorgio F, Nioi M, d'Aloja E, Locci E. Translating metabolomic evidence from an animal model to a human scenario: the post-mortem interval issue. [Under Review, Preprint: <https://doi.org/10.1101/2025.04.15.648907>]. 2025.
2. Chighine A, Locci E. Daubert and Omics: Exploring the Use of Complex Scientific Evidence in Court. [Under Review, Preprint: [https://doi.org/10.31219/osf.io/a5fhj\\_v1](https://doi.org/10.31219/osf.io/a5fhj_v1)]. 2025.
3. Pilia E, Mastrostefano A, Germanò T, Amato G, Ciccu C, d'Aloja E, Locci E, Chighine A. A Systematic Review of the Diagnostic Value of Post-Mortem Blood Tryptase in Fatal Anaphylaxis: Assessment of Sensitivity and Specificity. [Under Review]. 2025.
4. Chighine A, Ferino G, Nioi M, d'Aloja E, Locci E. Fatal acute intoxication after snorting cocaine and fluoxetine. \*Leg Med (Tokyo)\* 2025. Doi: 10.1016/j.legalmed.2025.102614
4. Della Rocca C, Chighine A, Piras G, Vecchio C, Mameli A. Nails as optimal source of DNA for molecular identification of 5 decomposed bodies recovered from seawater: from Y-ancestry to personal identification. \*Int J Legal Med\*. 2024;138(3):787-792. doi: 10.1007/s00414-024-03170-x.
5. Chighine A, Stocchero M, Ferino G, De-Giorgio F, Conte C, Nioi M, d'Aloja E, Locci E. Metabolomics investigation of post-mortem human pericardial fluid. \*Int J Legal Med\*. 2023;137(6):1875-1885. doi: 10.1007/s00414-023-03050-w.
6. Locci E, Stocchero M, Gottardo R, Chighine A\*, De-Giorgio F, et al. PMI estimation through metabolomics and potassium analysis on animal vitreous humour. \*Int J Legal Med\*. 2023;137(3):887-895. doi: 10.1007/s00414-023-02975-6. \*Corresponding author.
7. Chighine A, Corona A, Catani G, Conte C, Demontis R, Nioi M. A fatal case of metastatic pulmonary calcification during the puerperium. \*Int J Mol Sci\*. 2022;23(23):15131. doi: 10.3390/ijms232315131.
8. Laou E, Mavridis T, Papagiannakis N, Pais G, Chighine A, et al. Blood biomarkers and metabolomic profiling for the early diagnosis of vancomycin-associated acute kidney injury: a systematic review and meta-analysis of experimental studies. \*J Pers Med\*. 2022;12(9):1397. doi: 10.3390/jpm12091397.
9. Nioi M, Napoli PE, Demontis R, Chighine A, De-Giorgio F, et al. The influence of eyelid position and environmental conditions on the corneal changes in early postmortem interval: a prospective, multicentric OCT study. \*Diagnostics (Basel)\*. 2022;12(9):2169. doi: 10.3390/diagnostics12092169.

10. Locci E, Liu J, Pais GM, Chighine A, Kahnmoie DA, et al. Urinary metabolomics from a dose-fractionated polymyxin B rat model of acute kidney injury. *\*Int J Antimicrob Agents\**. 2022;60(1):106593. doi: 10.1016/j.ijantimicag.2022.106593.
11. Bonicelli A, Mickleburgh HL, Chighine A, Locci E, Wescott DJ, Procopio N. The 'ForensOMICS' approach for postmortem interval estimation from human bone by integrating metabolomics, lipidomics, and proteomics. *\*eLife\**. 2022;11:e83658. doi: 10.7554/eLife.83658.
12. Chighine A, Locci E, Ferino G, De-Giorgio F, d'Aloja E. Letter to the editor regarding the article 'ER stress-related protein, CHOP, may serve as a biomarker of mechanical asphyxia: a primary study' by Hu and colleagues. *\*Int J Legal Med\**. 2022;136(3):969-970. doi: 10.1007/s00414-022-02808-y.
13. Congiu T, Fanni D, Piras M, Gerosa C, Cau F, et al. Ultrastructural findings of lung injury due to vaccine-induced immune thrombotic thrombocytopenia (VITT) following COVID-19 vaccination: a scanning electron microscopic study. *\*Eur Rev Med Pharmacol Sci\**. 2022;26(1):270-277. doi: 10.26355/eurrev\_202201\_27777.
14. Chighine A, Porcu M, Ferino G, Lenigno N, Trignano C, d'Aloja E, Locci E. Infant urinary metabolomic profile in a fatal acute methadone intoxication. *\*Int J Legal Med\**. 2022;136(1):1-10. doi: 10.1007/s00414-021-02772-z.
15. Nioi M, Napoli PE, d'Aloja E, Nieddu D, Chighine A, Fossarello M, Demontis R. Postmortal dark scleral spots: results from a study of 905 cases from a single institution. *\*Invest Ophthalmol Vis Sci\**. 2022;64(8):4768-4768.
16. Congiu T, Demontis R, Cau F, Piras M, Fanni D, et al. Scanning electron microscopy of lung disease due to COVID-19 - a case report and a review of the literature. *\*Eur Rev Med Pharmacol Sci\**. 2021;25(24):7997-8003. doi: 10.26355/eurrev\_202112\_27650.
17. Fanni D, Cerrone G, Saba L, Demontis R, Congiu T, et al. Thrombotic sinusoiditis and local diffuse intrasinusoidal coagulation in the liver of subjects affected by COVID-19: the evidence from histology and scanning electron microscopy. *\*Eur Rev Med Pharmacol Sci\**. 2021;25(19):5904-5912. doi: 10.26355/eurrev\_202110\_26866.
18. Chighine A, Locci E, Nioi M, d'Aloja E. Looking for post-mortem metabolomic standardization: waiting for Godot—the importance of post-mortem interval in forensic metabolomics. *\*Chem Res Toxicol\**. 2021;34(9):1946-1947. doi: 10.1021/acs.chemrestox.1c00211.
19. Fanni D, Saba L, Demontis R, Gerosa C, Chighine A, et al. Vaccine-induced severe thrombotic thrombocytopenia following COVID-19 vaccination: a report of an autoptic case and review of the literature. *\*Eur Rev Med Pharmacol Sci\**. 2021;25(15):5063-5069. doi: 10.26355/eurrev\_202108\_26464.
20. Locci E\*, Chighine A\*, Noto A, Ferino G, Baldi A, et al. Metabolomics improves the histopathological diagnosis of asphyxial deaths: an animal proof-of-concept model. *\*Sci Rep\**. 2021;11(1):10102. doi: 10.1038/s41598-021-89570-0. \*Equally contributed.
21. Locci E, Stocchero M, Gottardo R, De-Giorgio F, Demontis R, et al. Comparative use of aqueous humour 1H NMR metabolomics and potassium concentration for PMI estimation in an animal model. *\*Int J Legal Med\**. 2021;135(3):845-852. doi: 10.1007/s00414-020-02468-w.
22. Locci E, Bazzano G, Chighine A, Locco F, Ferraro E, Demontis R, d'Aloja E. Forensic NMR metabolomics: one more arrow in the quiver. *\*Metabolomics\**. 2020;16(11):118. doi: 10.1007/s11306-020-01743-6.
23. Locci E, Bazzano G, Demontis R, Chighine A, Fanos V, d'Aloja E. Exploring perinatal asphyxia by metabolomics. *\*Metabolites\**. 2020;10(4):141. doi: 10.3390/metabol0040141.
24. Locci E, Stocchero M, Noto A, Chighine A, Natali L, et al. A 1H NMR metabolomic approach for the estimation of the time since death using aqueous humour: an animal model. *\*Metabolomics\**. 2019;15(5):76. doi: 10.1007/s11306-019-1533-2.
25. d'Aloja E, Chighine A, Gabiati L. Letter by d'Aloja et al regarding article, "Competitive sport participation among athletes with heart disease: a call for a paradigm shift in decision making". *\*Circulation\**. 2018;137(18):1986-1987. doi: 10.1161/CIRCULATIONAHA.117.033082.

**Bibliometric Indices** (Scopus ID 24435978600, as of May 2025)

- Publications: 24
- Preprints: 5
- H-index (7 years): 11
- Total Citations (7 years): 307

**Book Chapters**

1. Chighine, A., Nioi, M., Carniato, A., d'Aloja, E., Locci, E. (2024). Estimation of the time since death through metabolomic approaches. In: HIRAK, R.D., KELLY, M.E., AL-SNAN, N. (Eds.), *\*Advances in Forensic Biology and Genetics\**. Springer Nature. [In Press]
2. Chighine, A., Fratini, R., d'Aloja, E., Nioi, M. (2024). A conundrum waiting for clinical, technical, and medico-legal solutions: looking for the "perfect biomarker" of perinatal asphyxia. In: PANI, D. (Ed.), *\*Innovative Technologies and Signal Processing in Perinatal Medicine\**. Springer.
3. Chighine, A., Nioi, M., Demontis, R., d'Aloja, E. (2020). Aspetti medico-legali dell'infezione da SARS-CoV-2 (COVID-19) in ambito pediatrico. In: *\*Bambini e Covid-19: come orientarsi\**. Hygeya Press.

**Conference Presentations** (Selected)

- A Metabolomic Regression Model for PMI Estimation on Human Pericardial Fluid. *\*77th Annual AAFS Scientific Conference\**, Baltimore, MD, USA. 2025 Feb. [Oral].
- Iter approvativo dei vaccini anti Sars-CoV-2: elusione o necessità? [I vaccini tra libertà individuale e solidarietà collettiva]. Cagliari, Italy. 2024 Jun. [Oral].
- <sup>1</sup>H NMR metabolomics on human pericardial fluid: A regression model for PMI estimation. *\*26th Congress of the International Academy of Legal Medicine (IALM)\**, Athens, Greece. 2024 May. [Oral].
- Post-mortem interval estimation on aqueous humour: human translation from an animal model. *\*4th International Caparica Conference in Translational Forensics 2024\**, Caparica, Portugal. 2024 Oct. [Oral].
- A review of PMI estimation by metabolomics approaches. *\*XI National Meeting GIPF Update in Forensic Pathology: From Daily Practice to the Courtroom\**, Rome, Italy. 2024 Apr. [Oral].
- A metabolomic investigation of post-mortem human pericardial fluid. *\*76th Annual AAFS Scientific Conference\**, Denver, CO, USA. 2024 Feb. [Oral].
- A comparative use of aqueous humor <sup>1</sup>H Nuclear Magnetic Resonance (NMR) metabolomics and potassium concentration for Postmortem Interval (PMI) estimation in an animal model;
- Metabolomics improves the histopathological diagnosis of asphyxial deaths: An animal proof-of-concept model;
- Unravelling the mechanism of death through urine metabolome analysis: An infant methadone intoxication. *\*75th Annual AAFS Scientific Conference\**, Orlando, FL, USA. 2023 Feb. [Oral].
- PMI estimation through a NMR metabolomic approach on animal vitreous humour. *\*3rd International Caparica Conference in Translational Forensics 2022\**, Caparica, Portugal. 2022 Oct. [Oral].
- Clinical pharmacist research: Theory and practice - GDPR and personal data processing in research processes [La ricerca per il farmacista clinico: teoria e pratica - La gestione della privacy: il GDPR e il trattamento dei dati personali nei processi di ricerca]. *\*SIFaCT (Società Italiana di Farmacia Clinica e Terapia)\**, Cagliari, Italy. 2022 Jun. [Oral].
- Differenze tra consenso informato nell'atleta agonista e nell'atleta non idoneo soggetto a prescrizione dell'esercizio fisico. *\*Il Giornata Sarda di Medicina dello Sport, Federazione Medico Sportiva Italiana (FMSI), CR Sardegna\**, Webinar. 2022 May. [Oral].
- A metabolomic profile of aqueous humor in a 24-hour period after death: An animal model for Postmortem Interval (PMI) estimation. *\*AAFS - 72nd Annual Scientific Meeting\**, Anaheim, CA, USA. 2020 Feb. [Oral].
- Metabolomic profile of aqueous humour in a 24-hours period after death: An animal model for post-mortem interval estimation. *\*Advances in NMR and MS based Metabolomics, IMASS (Italian Mass Spectrometry Society)\**, Lucca, Italy. 2019 Nov. [Oral].

## **Teaching**

*Invited Lecturer*, University of Verona, Italy | April 2025

- Deliver seminar on "Metabolomics in Forensic Sciences" to graduate students and researchers.

*Lecturer*, Bachelor's Programs in Midwifery, University of Cagliari, Italy | 2025

- Legal Medicine - 16 hours course.

*Lecturer*, Bachelor's Programs in Professional Education, University of Cagliari, Italy | 2025

- Legal Medicine - 16 hours course.

*Invited Teacher*, University of Crete, Greece | 2024-2025

- Taught "Early Postmortem Changes" and "Post-mortem Interval and Metabolomics" (4 hours per year) in the Forensic Medicine, Anthropology, and Imaging postgraduate program (MSc).

*Visiting Fellow*, University of Ljubljana, Slovenia & Institut Médico-Légal, Paris, France | May 2023, March 2024, May 2025

- Delivered lectures on Italian medico legal system, peculiar forensic cases, PMI estimation, metabolomics and forensic sciences.

*Invited Guest Lecturer*, University of Central Lancashire, Preston, UK | April 2023

- Taught 8 hours on forensic metabolomics and autopsy case studies to undergraduate and postgraduate students.

*Tutor*, *Legal Medicine Specialization Program*, University of Cagliari, Italy | 2020-Present

- Mentor residents in autopsy techniques, medico-legal evaluations, and research ethics.

*Thesis Advisor*, University of Cagliari, Italy | 2020-Present

- Supervise MD and legal medicine residents in thesis preparation on legal medicine.

## **Reviewer activity**

Reviewer Board Member, \*Metabolites\* (MDPI) | 2024-Present

Peer Reviewer for journals edited by Springer, Elsevier, MDPI, Taylor & Francis, ACS | 2019-Present

- Review forensic and general manuscripts for high-impact journals.

## **Affiliations**

- American Academy of Forensic Sciences, Associate Member (#50074) | 2024

- Italian Society of Legal Medicine and Insurance (SIMLA), Ordinary Member | 2021-present

- Italian Group of Forensic Pathology (GIPF), Ordinary Member | 2024

- International Society of Forensic Radiology and Imaging (ISFRI), PhD/Resident Member | 2017-2018

## **Language Skills**

Italian (native), English (C1, IELTS 7.0), Portuguese and Spanish (B1).

Cagliari, May 2025

Alberto Chighine