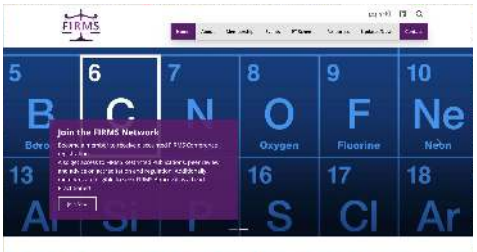
ISO-TOPICS: THE FIRMS NETWORK NEWSLETTER

May 2025

ABOUT US

The Forensic Isotope Ratio Mass Spectrometry (FIRMS) Network was founded to develop the scope of stable isotope techniques in forensic applications.

FIRMS brings together chemists, physicists, materials scientists, and life scientists who employ isotopic analysis in their respective fields. FIRMS is helping to focus collective knowledge and expertise on improving methods for crime detection and reduction.



Please visit the newly redesigned website for the FIRMS Network! Thank you to natiive Web Design Wollongong for their help in the design process.

WELCOME

Welcome to the FIRMS May 2025 newsletter. To provide feedback on this newsletter, please contact us at news@forensic-isotopes.org

DISCLAIMER

Reference to or mention of any commercial product or process by specific trademark or manufacturer within this newsletter does not necessarily represent an endorsement by the FIRMS Network.

FIRMS CONFERENCE 2025

Registration is now open for the **9th Conference of the FIRMS Network**! Abstract submissions are being accepted through 30 June. Please note that space is limited due to venue capacity, so register and submit your abstract soon. Presentations will be Tuesday-Thursday, 16-18 September 2025, with an add-on workshop Monday, 15 September. More details are available online: https://www.forensic-isotopes.org/firms-conference-2025/

Join us at Burlington House in Piccadilly, London from 15 to 18 September 2025

After reviewing the conference details, be sure to check out the rest of the newly redesigned website for the FIRMS Network! The address is: https://www.forensic-isotopes.org.

UPDATES FROM THE STEERING GROUP

The Steering Group would like to **thank Andrew Kilkenny and Chris Ambrose from natiive Web Design Wollongong** for their patience and expert guidance during the website update process. Thanks are also due to **Will Anglin, who single-handedly maintained a website** for the FIRMS Network for years.

A reminder that Steering Group Members Phil Dunn and Ethan Strak have produced three recordings on topics of interest to the FIRMS Network, which are now available on the website under Resources.

There have been **Office changes within the Steering Group**. Please welcome (again) Phil Dunn, who has agreed to serve another term as Chair; Ethan Strak has taken over as Treasurer. The Steering Group would like to extend its sincere gratitude to Helen Salouros for capably serving as Chair the past three years.

Please welcome the new FIRMS Network Chair, Phil Dunn, and Treasurer, Ethan Strak!

The Steering Group still plans to publish a **3rd edition of the GPG** (*Good Practice Guide for Isotope Ratio Mass Spectrometry*) prior to the FIRMS Conference 2025. If you have suggested edits to the guide, please submit them to gpg@forensic-isotopes.org. Note that a database guide is also in development.

NEWS AND NOTICES

There are several meetings taking place this summer that some FIRMS Network members may be attending. These include the **ASITA Conference 2025** (Advances in Stable Isotope Techniques and Applications), 18-21 May 2025 in Port Aransas, Texas, USA; **JESIUM 2025** (Joint European Stable Isotopes Users group Meeting), 16-20 June 2025 in Groningen, the Netherlands; and **Back to the Future 2025** (Zooarchaeological Isotope Approaches to Modern Questions), 25-28 June 2025 at the University of Reading.

The IAEA has announced a **Practical Training Course on Data Processing and Interpretation Applied to Isotope Hydrology Studies** scheduled for 29 September – 3 October 205. The event code is EVT2303865 and additional details should be available soon: https://www.iaea.org/events/evt2303865.

HIGHLIGHTED PUBLICATIONS

The outcomes of the 2024 IAEA Experts Meeting have been published in an open access article with FIRMS Chair Phil Dunn and FIRMS Member Federica Camin as coauthors. This new paper discusses the existence and use of two carbon isotope delta scales: the VPDB scale and the VPDB-LSVEC scale. It also encourages laboratories to improve consistencies in the isotopic analysis of "non-exchangeable hydrogen" in bulk organic materials and oxygen in carbonates using the phosphoric acid reaction method. For details, see: https://analyticalsciencejournals.onlinelibrary.wiley.com/doi/10.1002/rcm.10018

A new book in the Advances in Isotope Geochemistry series is now available from Springer, *The Geochemistry of Stable Chlorine and Bromine Isotopes* (by Hans Eggenkamp): https://link.springer.com/book/10.1007/978-3-031-75633-7

For anyone who teaches, this paper describes a "workshop that prompts chemistry students in the final 2 years of secondary school to apply their understanding of modern analytical chemistry techniques to a 'real world' example": https://analyticalsciencejournals.onlinelibrary.wiley.com/doi/10.1002/rcm.9970

PUBLICATIONS LIST

Disclaimer: This section contains a non-comprehensive list of recent publications that may be of interest to members. Inclusion does not necessarily mean that the FIRMS Network approves the content. You are encouraged to consider critically whether (i) the experimental work complies with SI guidelines and the Good Practice Guide; and (ii) the conclusions drawn are based on sound scientific background information.

A special issue of *TrAC Trends in Analytical Chemistry* entitled "Advances in Stable Isotopes" has been published: https://www.sciencedirect.com/special-issue/10SD4B2LC26. Articles that include a member of the FIRMS Network as an author are marked with an asterisk (*) below.

The current issue of the journal *Forensic Anthropology*, published by the University of Florida Press, focuses on applications of stable isotope analysis in forensic anthropology. A list of the research articles contained in the issue is available online: https://journals.upress.ufl.edu/fa/issue/view/420. Articles that include a member of the FIRMS Network as an author are marked with a double asterisk (**) below.

Aguzzoni A, Giammarchi F, Mundo IA, et al (2025) Tracing timber origin: Geographic provenancing at regional scale with multielement and strontium isotope ratio analyses. Forest Ecology and Management 579:122494. https://doi.org/10.1016/j.foreco.2025.122494

**Ammer S, Bartelink E, Vollner J, et al (2025) Spatial distributions of isotope ratios in tap water, hair, and teeth from Latin America for region-of-origin predictions of unidentified border crossers. Forensic Anthropology 8:118-130

Bakkour R, Wabnitz C, Glöckler D (2024) Lack of selectivity in sample preparation – An Achilles heel of compound-specific isotope analysis for environmental micropollutants. TrAC Trends in Analytical Chemistry 180:117908. https://doi.org/10.1016/j.trac.2024.117908

**Beasley M, Lesnik J, McKee-Zech H, Duncan A (2024a) Using stable nitrogen isotope ratios from human skeletal muscle tissue for Postmortem Interval (PMI) estimation (Part 1). Forensic Anthropology. https://doi.org/10.5744/fa.2023.0001

**Beasley M, Lesnik J, McKee-Zech H, Duncan A (2024b) Using stable nitrogen isotope ratios from human skeletal muscle tissue for Postmortem Interval (PMI) estimation (Part 2). Forensic Anthropology. https://doi.org/10.5744/fa.2023.0002

*Chen L, Bontempo L (2025) Application of isotope ratio mass spectrometry (IRMS) in the geographical determination of selected herbs: A review. TrAC Trends in Analytical Chemistry 183:118107. https://doi.org/10.1016/j.trac.2024.118107

**Chesson L, Chau T, Edwards A, Berg G (2021) Calculation and interpretation of inter-laboratory variation in isotope delta (δ) values using Real Interpretative Differences. Forensic Anthropology 4:26–34. https://doi.org/10.5744/fa.2020.0050

Dombrowski A, Wojtal PK, Pan H, et al (2025) Stable carbon and sulfur isotopic compositions of per- and polyfluoroalkyl substances. Environmental Science & Technology Letters 12:216–221. https://doi.org/10.1021/acs.estlett.5c00021

Dong Y, Feldberg L, Aharoni A, Heinig U (2024) Metabolite annotation through stable isotope labeling. TrAC Trends in Analytical Chemistry 181:118037. https://doi.org/10.1016/j.trac.2024.118037

**Edwards A, Chesson L, Bartelink E, et al (2022) Using Real Interpretative Differences to assess inter-laboratory isotopic variability due to sample preparation. Forensic Anthropology 5:13–24. https://doi.org/10.5744/fa.2020.0045

Eggenkamp H (2025) The Geochemistry of Stable Chlorine and Bromine Isotopes. Springer Nature Switzerland, Cham

Gačnik J, Živković I, Horvat M (2025) Mercury isotopes in the atmosphere: Synthesis, perspectives and analytical considerations. TrAC Trends in Analytical Chemistry 189:118257. https://doi.org/10.1016/j.trac.2025.118257

Gamboa-Delgado J, Sánchez-Díaz R (2025) Wild or farmed: Carbon and nitrogen stable isotope values as natural biomarkers to improve the traceability of endangered totoaba (*Totoaba macdonaldi*, Sciaenidae). Aquatic Conservation 35:e70091. https://doi.org/10.1002/aqc.70091

*Giannioti Z, Ogrinc N, Suman M, et al (2024) Isotope ratio mass spectrometry (IRMS) methods for distinguishing organic from conventional food products: A review. TrAC Trends in Analytical Chemistry 170:117476. https://doi.org/10.1016/j.trac.2023.117476

*Johnson DL, Chau TH, Chesson LA (2025) The oxygen isotopic composition of tooth enamel carbonate: A review of measurement methods & forensic applications. TrAC Trends in Analytical Chemistry 183:118084. https://doi.org/10.1016/j.trac.2024.118084

Khaliq S, Jochmann MA, Hesse T, et al (2024) Compound-specific isotope analysis of amino acids for aquatic systems – Problems, challenges, solutions: A review. TrAC Trends in Analytical Chemistry 181:118038. https://doi.org/10.1016/j.trac.2024.118038

Kim D-M, Im D-G, Kwon H-L, et al (2025) Assessing seepage sources of a tailings dump and fractionation of Mo and Zn isotopes. Science of The Total Environment 964:178555. https://doi.org/10.1016/j.scitotenv.2025.178555

**Kramer R, Bartelink E (2022) Childhood and adulthood residency prediction using strontium ($^{87}Sr/^{86}Sr$) and oxygen ($\delta^{18}O$) isotopes for unidentified deceased migrants recovered in Southern Texas. Forensic Anthropology 5:25–45. https://doi.org/10.5744/fa.2020.0054

Kümmel S, Ottosen CF, Olsson ME, et al (2025) Development of a $\delta^{13}C$ and $\delta^{34}S$ isotope analysis method for sulfadimidine and its potential to trace contaminant transformation in groundwater systems. Analytical Chemistry 97:4014–4020. https://doi.org/10.1021/acs.analchem.4c05625

Ma Y, Li Y, Shao F, et al (2025) Advancing stable isotope analysis for alcoholic beverages' authenticity: Novel approaches in fraud detection and traceability. Foods 14:943. https://doi.org/10.3390/foods14060943

Miller BM, Carter JF, Cresswell SL, et al (2025) Isotope fractionation during synthesis of methamphetamine from propiophenone, $NaNO_2$ and dimethyl carbonate. Forensic Chemistry 44:100661. https://doi.org/10.1016/j.forc.2025.100661

Mortishire-Smith RJ, Mortishire-Smith BJ, Smith JS (2025) From *Breaking Bad* to Breaking Bonds—Mass Spectrometry in the Classroom. Rapid Communications in Mass Spectrometry e9970. https://doi.org/10.1002/rcm.9970

Otero F, Loupias LL, Mancini LH, et al (2025) From local farms to supermarket foods: The story of the homogenization of the Argentine diet told by the isotope ratios of modern teeth. American Journal of Human Biology 37:e24167. https://doi.org/10.1002/ajhb.24167

Page S, Dunn PJH, Petrov P, et al (2025) An isotope dilution approach for validating the output of mercury gas generators for mercury pollution monitoring. Journal of Analytical Atomic Spectrometry 40:785–794. https://doi.org/10.1039/D4JA00373J

Parson W, Alterauge A, Amory C, et al (2025) Remains of the German outlaw Johannes Bückler alias Schinderhannes identified by an interdisciplinary approach. Forensic Science International: Genetics 78:103276. https://doi.org/10.1016/j.fsigen.2025.103276

Perez-Mon C, Hauk C, Roncone A, et al (2025) Hide and seek with falsified medicines: Current challenges and physico-chemical and biological approaches for tracing the origin of trafficked products. Forensic Science International 370:112474. https://doi.org/10.1016/j.forsciint.2025.112474

*Perini M, Pianezze S, Bontempo L (2024) Stable Isotope Ratio Mass Spectrometry and Site-Specific Natural Isotope Fractionation-Nuclear Magnetic Resonance applications to discriminate between synthetic and natural analogs: A review. TrAC Trends in Analytical Chemistry 180:117966. https://doi.org/10.1016/j.trac.2024.117966

Pilecky M, Meador TB, Wassenaar LI (2025) Advancements in compound-specific hydrogen stable-isotope analysis of fatty and amino acids. TrAC Trends in Analytical Chemistry 186:118194. https://doi.org/10.1016/j.trac.2025.118194

Quinn R, Alesbury H, Ceja L, et al (2021) Food has no borders: Methodological insights from the forensic isotopic profile of a New York City immigrant. Forensic Anthropology. https://doi.org/10.5744/fa.2020.0043

*Roncone A, Kelly SD, Giannioti Z, et al (2024) Stable isotope ratio analysis: An emerging tool to trace the origin of falsified medicines. TrAC Trends in Analytical Chemistry 174:117666. https://doi.org/10.1016/j.trac.2024.117666

This newsletter was compiled and edited by Lesley Chesson. It was created using a Microsoft® Word template.

Have Feedback? Contact Us

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Samborska-Goik K, Wassenaar LI (2025) Reimagining the Kendall plot: Using $\delta^{15}N$ and $\delta^{18}O$ of nitrate and advanced machine learning to improve N pollutant source classification. Isotopes in Environmental and Health Studies 1–26. https://doi.org/10.1080/10256016.2025.2467863

Santos E, Kim B, Tarozo R, et al (2025) A long-lasting, high-stability reactor system for compound-specific carbon isotope analyses. Journal of Analytical Atomic Spectrometry 39:e10020. https://doi.org/10.1002/rcm.10020

**Saul TB, Chesson LA, Steadman DW, Gordon GW (2021) Considerations for stable isotope analysis of human hair: The impact of postmortem environmental exposure. Forensic Anthropology 4:173–184

Solís C, Gil-Chavarría I, Rodríguez-Ceja M, et al (2025) The use of ^{13}C, ^{14}C and ^{18}O of dental enamel to estimate the year of birth and geographic origin from Mexican individuals. Radiocarbon 1–8. https://doi.org/10.1017/RDC.2024.130

Srivastava A, Chartrand M, Camin F, et al (2025) Developing calibration and measurement capabilities for atmospheric CH_4 stable isotope ratios at NMIs/DIs: Metrology for global comparability. Metrologia. https://doi.org/10.1088/1681-7575/adcfa8

Terro C, Modic R, Ogrinc M, et al (2025) IsoFoodTrack: A comprehensive database and management system based on stable isotope ratio analysis for combating food fraud. Frontiers in Nutrition 12:1516521. https://doi.org/10.3389/fnut.2025.1516521

Turan H, Sebilo M, Imfeld G, et al (2025) Potential of compound-specific isotope analysis (CSIA) to trace galaxolide reactivity and origin. ACS EST Water 5:566–574. https://doi.org/10.1021/acsestwater.4c00498

Valenzuela LO, Plens C, Otero F, et al (2025) Intra-individual stable isotope variation tracks Brazilian contemporary dietary and nutritional transition. American Journal of Biological Anthropology 186:e25057. https://doi.org/10.1002/ajpa.25057

Verostick KA, Serna A, Stantis C, Bowen GJ (2025) Human tissue oxygen and strontium isotope values in North America: A data compilation and assessment for forensic geolocation. Journal of Forensic Sciences 70:905–920. https://doi.org/10.1111/1556-4029.70030

Xie W, Zhu J, Hu C, et al (2025) Carbon and hydrogen isotope analysis of triacetone triperoxide using solid-phase microextraction coupled to GC-IRMS. Forensic Science International 367:112391. https://doi.org/10.1016/j.forsciint.2025.112391

Zhao P, Wang Y (2025) Cotton as a source of isotopic biases in extracted water via cryogenic vacuum extraction. Journal of Hydrology 654:132837. https://doi.org/10.1016/j.jhydrol.2025.132837