

# ISO-TOPICS: THE FIRMS NETWORK NEWSLETTER

May 2022

## 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.



The  
Chartered  
Society of  
Forensic  
Sciences

*The 8<sup>th</sup> FIRMS Network conference is being facilitated with the help of The Chartered Society of Forensic Sciences. Abstract submission is open now through 17 June.*

## WELCOME

Welcome to the FIRMS May 2022 newsletter.

## 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.

## 8<sup>TH</sup> FIRMS NETWORK CONFERENCE

Abstract submission for the 2022 conference of the FIRMS Network is now open. The conference will take place virtually via Zoom and feature oral and poster presentations.

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*The 8<sup>th</sup> FIRMS Network Conference will take place  
from 5 to 7 October.*

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To submit an abstract, please download and complete the form available here: <https://www.forensic-isotopes.org/2022.html>. Abstract submission is from 18 April until 17 June.

Conference registration details will be available in July. We hope to “see” you in October!

## UPDATES FROM THE STEERING GROUP

There is still time to register your interest in the **2022 case-based proficiency test**: <https://www.forensic-isotopes.org/CBPT.php>

The scenario will involve polymer-based physical evidence and will require the comparison of two or more exhibits by whatever methods the laboratory feels appropriate. Laboratories will be expected to provide a report in their usual format. Reports will be anonymised and sent to a member of the FIRMS Steering Group to compile a summary that will be circulated to all participants.

The FIRMS Network has **two new Steering Group Members**, Joe Meikle (AFP) and Stephan Hlohowskyj (FBI). Welcome, Joe and Stephan!

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*Please extend a warm welcome to the newest members of the Steering Group, Joe Meikle and Stephan Hlohowskyj!*

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**Membership invoices were issued**, with payment due 31 March 2022. If you applied for membership and did not receive an invoice, or have not yet paid, please contact Treasurer Phil Dunn.

Finally, the FIRMS Network has a Twitter account! Follow us **@forensicisotopes**. Please contact us with feedback or content suggestions for Twitter or the next newsletter.

## NEWS AND NOTICES

Many scientific meetings that were postponed due to the COVID-19 pandemic have been rescheduled:

The 12<sup>th</sup> International Conference on the Applications of Stable Isotope Techniques to Ecological Studies (**IsoEcol**) will be held in Gaming, Austria from 6 to 10 June 2022.

The **ASITA** (Advances in Stable Isotopes Techniques and Applications) conference will be held in Montreal, Canada 13-15 June 2022.

The 25<sup>th</sup> Symposium of the **Australian and New Zealand Forensic Science Society** will be held in Sydney, Australia between 11 and 15 September 2022.

The **8<sup>th</sup> International Clumped Isotopes Workshop** will be held 19-22 September 2022 in Jerusalem, Israel. Abstraction submission is now open and will close 15 July. Registration details will be available soon.

The **Joint European Stable Isotope User Meeting** (JESIUM) will take place 10-14 October 2022 in Kuopio, Finland – and online. Abstract submission has closed but registration is open until 12 September 2022.

The Isotope Workshop XVI planned by the **European Society of Isotopes Research** is now scheduled for 10-13 July 2023. It will take place in Salzburg, Austria.

## HIGHLIGHTED PUBLICATIONS

Outgoing Chair Phil Dunn recently published an update on the work and deliverables of the FIRMS Network during his six years as Chair (<https://doi.org/10.1016/j.forc.2022.100414>).

The IUPAC Commission on Isotopic Abundances and Atomic Weights (CIAAW) has released the “Standard Atomic Weights of the Elements 2021” (<https://doi.org/10.1515/pac-2019-0603>).

In 2021, the journal *Analytical and Bioanalytical Chemistry* published “Isotope delta challenge,” authored by Phil Dunn and Juris Meija. The puzzle (<https://link.springer.com/article/10.1007/s00216-021-03607-x>) and its solution (<https://link.springer.com/article/10.1007/s00216-022-03903-0>) are available online. We encourage readers to test themselves with the challenge.

## 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.*

- Barry A, Thomson S, Dimayuga I, et al (2022) Isotope ratio method: State-of-the-art of forensic applications to CBRNE materials. *Canadian Society of Forensic Science Journal* 1–27. <https://doi.org/10.1080/00085030.2022.2054109>
- Berg GE, Chesson LA, Yuryang J, et al (2022) A large-scale evaluation of intraperson isotopic variation within human bone collagen and bioapatite. *Forensic Science International* 336:111319. <https://doi.org/10.1016/j.forsciint.2022.111319>
- Bin L, Wang C, Liu Z, et al (2022) Geographical origin traceability of muskmelon from Xinjiang province using stable isotopes and multi-elements with chemometrics. *Journal of Food Composition and Analysis* 106:104320. <https://doi.org/10.1016/j.jfca.2021.104320>
- Chartrand MMG, Chubchenko I, Dunn PJH, et al (2022) Final report on CCQM-K167: Carbon isotope delta measurements of vanillin. *Metrologia* 59:08004. <https://doi.org/10.1088/0026-1394/59/1A/08004>
- Chesson L, Chau T, Edwards A, Berg G (2021) Calculation and interpretation of inter-laboratory variation in isotope delta ( $\delta$ ) values using Real Interpretative Differences. *Forensic Anthropology* 4. <https://doi.org/10.5744/fa.2020.0050>
- Collins M (2022) Illicit drug profiling: A historical perspective. *Drug Testing and Analysis* 14:404–410. <https://doi.org/10.1002/dta.3144>
- Cormick J, Carter JF, Currie T, et al (2022) Isotope fractionation during the synthesis of MDMA.HCl from helional. *Forensic Chemistry* 28:100406. <https://doi.org/10.1016/j.forc.2022.100406>
- Cucinotta L, De Grazia G, Micalizzi G, et al (2022) Simultaneous evaluation of the enantiomeric and carbon isotopic ratios of *Cannabis sativa* L. essential oils by multidimensional gas chromatography. *Anal Bioanal Chem*. <https://doi.org/10.1007/s00216-022-04035-1>
- de Oliveira Mascarenhas R, Sena-Souza JP, Bernasconi SM, et al (2022) Building an isoscape based on tooth enamel for human provenance estimation in Brazil. *Forensic Science International* 330:111109. <https://doi.org/10.1016/j.forsciint.2021.111109>
- Donnelly L, Pirrie D, Harrison M, et al (eds) (2021) *A guide to forensic geology*. The Geological Society, London
- Dunn PJH (2022) The FIRMS Network: An update from the outgoing Chair. *Forensic Chemistry* 28:100414. <https://doi.org/10.1016/j.forc.2022.100414>
- 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:. <https://doi.org/10.5744/fa.2020.0045>
- Hoffman DW, Rasmussen C (2022) Absolute carbon stable isotope ratio in the Vienna Peedee Belemnite isotope reference determined by  $^1\text{H}$  NMR spectroscopy. *Anal Chem* 94:5240–5247. <https://doi.org/10.1021/acs.analchem.1c04565>
- Jin B, Zhou X, Rogers KM, et al (2022) A stable isotope and chemometric framework to distinguish fresh milk from reconstituted milk powder and detect potential extraneous nitrogen additives. *Journal of Food Composition and Analysis* 108:104441. <https://doi.org/10.1016/j.jfca.2022.104441>
- Jones LM, Ceniccola-Campos KE, Morello DR (2022) Advances in cocaine signature methodology: Alkaloid and isotope profiles of coca grown in Puno, Peru. *Drug Testing and Analysis* 14:519–524. <https://doi.org/10.1002/dta.3198>
- Kootker LM, Laffoon JE (2022) Assessing the preservation of biogenic strontium isotope ratios ( $^{87}\text{Sr}/^{86}\text{Sr}$ ) in the pars petrosa ossis temporalis of unburnt human skeletal remains: A case study from Saba. *Rapid Comm Mass Spectrometry* 36. <https://doi.org/10.1002/rcm.9277>



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

## Contact Us

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

Kramer RT, Kinaston RL, Holder PW, et al (2022) A bioavailable strontium ( $^{87}\text{Sr}/^{86}\text{Sr}$ ) isoscape for Aotearoa New Zealand: Implications for food forensics and biosecurity. *PLoS ONE* 17:e0264458. <https://doi.org/10.1371/journal.pone.0264458>

Lansdown K, Jolliffe KA, Salouros H (2022) Investigations into the stable isotope ratios of 1-phenyl-2-propanone. *Drug Testing and Analysis* 14:496–504. <https://doi.org/10.1002/dta.2968>

Li C, Wang Q, Shao S, et al (2021) Stable isotope effects of biogas slurry applied as an organic fertilizer to rice, straw, and soil. *J Agric Food Chem* 69:8090–8097. <https://doi.org/10.1021/acs.jafc.1c01740>

Nie J, Shao S, Zhang Y, et al (2021) Discriminating protected geographical indication Chinese Jinxiang garlic from other origins using stable isotopes and chemometrics. *Journal of Food Composition and Analysis* 99:103856. <https://doi.org/10.1016/j.jfca.2021.103856>

Nims MK, Melville AM, Moran JJ, et al (2022) Compound specific stable isotope analysis of aromatics in diesel fuel to identify potential cocktailing. *Forensic Science International* 334:111244. <https://doi.org/10.1016/j.forsciint.2022.111244>

O'Sullivan R, Schmidt O, Monahan FJ (2022) Stable isotope ratio analysis for the authentication of milk and dairy ingredients: A review. *International Dairy Journal* 126:105268. <https://doi.org/10.1016/j.idairyj.2021.105268>

Perini M, Thomas F, Cabañero Ortiz AI, et al (2022) Stable isotope ratio analysis of lactose as a possible potential geographical tracer of milk. *Food Control* 139:109051. <https://doi.org/10.1016/j.foodcont.2022.109051>

Prohaska T, Irrgeher J, Benefield J, et al (2022) Standard atomic weights of the elements 2021 (IUPAC Technical Report). *Pure and Applied Chemistry*: <https://doi.org/10.1515/pac-2019-0603>

Rodiouchkina K, Rodushkin I, Goderis S, Vanhaecke F (2022) Longitudinal isotope ratio variations in human hair and nails. *Science of The Total Environment* 808:152059. <https://doi.org/10.1016/j.scitotenv.2021.152059>

Rogers KM, Turnbull JC, Dahl J, et al (2021) Authenticating bioplastics using carbon and hydrogen stable isotopes – An alternative analytical approach. *Rapid Commun Mass Spectrom* 35. <https://doi.org/10.1002/rcm.9051>

Saul T, Chesson L, Steadman D, Gordon G (2021) Considerations for stable isotope analysis of human hair: The impact of postmortem environmental exposure. *Forensic Anthropology*. <https://doi.org/10.5744/fa.2020.0052>

Shin W-J, Gautam MK, Shim J-Y, et al (2022) Spatial distributions of strontium isotope ratios in human hair and tap water from South Korea. *Science of The Total Environment* 806:151352. <https://doi.org/10.1016/j.scitotenv.2021.151352>

Snoeck C, Cheung C, Griffith JI, et al (2022) Strontium isotope analyses of archaeological cremated remains – new data and perspectives. *Data in Brief* 42:108115. <https://doi.org/10.1016/j.dib.2022.108115>

Vaiglova P, Lazar NA, Stroud EA, et al (2022) Best practices for selecting samples, analyzing data, and publishing results in isotope archaeology. *Quaternary International* S1040618222000593. <https://doi.org/10.1016/j.quaint.2022.02.027>

Walker MJ, Cowen S, Gray K, et al (2022a) Honey authenticity: The opacity of analytical reports - Part 1, Defining the problem. *Sci Food* 6:11. <https://doi.org/10.1038/s41538-022-00126-6>

Walker MJ, Cowen S, Gray K, et al (2022b) Honey authenticity: The opacity of analytical reports - Part 2, Forensic evaluative reporting as a potential solution. *Sci Food* 6:12. <https://doi.org/10.1038/s41538-022-00127-5>

Wu H, Zhou X, Chen H, et al (2022) A comparative authentication study of fresh fruit and vegetable juices using whole juice and sugar-specific stable isotopes. *Food Chemistry* 373:131535. <https://doi.org/10.1016/j.foodchem.2021.131535>

Xia W, Li C, Nie J, et al (2022) Stable isotope and photosynthetic response of tea grown under different temperature and light conditions. *Food Chemistry* 368:130771. <https://doi.org/10.1016/j.foodchem.2021.130771>

Xia W, Li Z, Yu C, et al (2021) Understanding processing, maturity and harvest period effects to authenticate early-spring Longjing tea using stable isotopes and chemometric analyses. *Food Control* 124:107907. <https://doi.org/10.1016/j.foodcont.2021.107907>

Zhou X, Yan Z, Jin B, et al (2021) Origin verification of imported infant formula and fresh milk into China using stable isotope and elemental chemometrics. *Food Control* 128:108165. <https://doi.org/10.1016/j.foodcont.2021.108165>