

# ISO-TOPICS: THE FIRMS NETWORK NEWSLETTER

April 2020

## 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*The editors of Forensic Chemistry are excited to receive submissions of novel, unpublished work following the 7<sup>th</sup> FIRMS Network Conference.*

## WELCOME

Welcome to the FIRMS April 2020 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.

## WELL WISHES

We hope this newsletter finds you and yours doing well during this unprecedented time. We know that everyone has been affected in some way by the recent COVID-19 outbreak. Please keep safety in mind in everything you do in the upcoming days and weeks.

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*Thank you for being a part of the forensic isotope community. Be safe and take care!*

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We look forward to seeing you again (soon) at a meeting or conference. Until then, wishing you good health now and in the future.

## UPDATES FROM THE STEERING GROUP

We have spoken to the editors of the journal *Forensic Chemistry* and they are excited to receive submissions of novel, unpublished work related to forensic applications of IRMS (and other, allied techniques). As mentioned previously, work presented at the 7<sup>th</sup> FIRMS Network Conference will be published in a special issue.

We invite you to **submit a manuscript for this special issue**; please reach out to register your interest. The Steering Group will provide regular updates regarding deadlines to interested parties. Ideally all manuscripts would be received by September 2020, for a 2021 publication date. Submissions should be based on presentations given at the 2019 meeting in Italy, but can be expanded upon as you see fit.

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*Reminder: Members have the opportunity to publish in an upcoming special issue of the journal Forensic Chemistry!*

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At its most recent meeting in February, the Steering Group reviewed the 7<sup>th</sup> FIRMS Network Conference to determine what went well and what could be improved upon for 2022. If you have **feedback on the conference you would be willing to share**, please contact us.

## NEWS AND NOTICES

Several meetings/events have been canceled or postponed in light of the COVID-19 outbreak:

EGU has canceled the physical General Assembly 2020 in Vienna, Austria. A series of online activities are planned the first week of May in lieu of the physical meeting, dubbed **EGU2020: Sharing Geoscience Online**. More information is available online.

The 2020 meeting of the Advances in Stable Isotope Techniques and Applications (**ASITA 2020**)—originally scheduled for 31 May to 3 June—has been canceled.

The 12<sup>th</sup> International Conference on the Applications of Stable Isotope Techniques to Ecological Studies (**IsoEcol**) has been postponed until 2021.

Organizers of the 2020 Joint European Stable Isotope Users group Meeting (**JESIUM 2020**) have extended the abstract submission deadline to 20 May 2020 and are monitoring the situation closely to determine what changes (if any) will be needed to the meeting schedule. It is currently planned for 4–9 October 2020.

Participants registered for the IAEA Isotope Hydrology Laboratory's 2020 international intercomparison for  $\delta^2\text{H}$ ,  $\delta^{18}\text{O}$ , and  $\delta^{17}\text{O}$  assays (**WICO 2020**) have been alerted to a delay, with details on new sample shipment and results reporting dates to come.

## HIGHLIGHTED PUBLICATIONS

In collaboration with the International Union of Geological Sciences, the Organization of Scientific Area Committees for Forensic Science, and the Federal Bureau of Investigation Forensic Laboratory, researchers from the University of Kentucky have published training materials related to soil evidence gathering for federal, state and local law enforcement agencies: <https://youtu.be/o9dWZOj1U5A>.

With co-author Brian Fry, Director Jim Carter reports the carbon isotopic composition of one atom in each amino acid of hair in “Stable carbon isotope diagnostics of mammalian metabolism, a high-resolution isotomics approach using amino acid carboxyl groups,” demonstrating that isotopic variations measured during *position*-specific isotope analysis are much larger than those measured during *compound*-specific isotope analysis: <https://doi.org/10.1371/journal.pone.0224297>.

Director Sean Doyle recently published “A review of the current quality standards framework supporting forensic science” in Wiley's *WIREs Forensic Science*: <https://doi.org/10.1002/wfs2.1365>.

Director and Chair Phil Dunn and colleagues have prepared a Letter to the Editor of the journal *Rapid Communications in Mass Spectrometry*, on “Calibration hierarchies for light element isotope delta reference materials.” The article is now available: <https://doi.org/10.1002/rcm.8711>.

## 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.*

Ammer STM, Bartelink EJ, Vollner JM, et al (2020) Spatial distributions of oxygen stable isotope ratios in tap water from Mexico for region of origin predictions of unidentified border crossers. *Journal of Forensic Sciences*. <https://doi.org/10.1111/1556-4029.14283>

Bartelink EJ, Chesson LA, Tipple BJ, et al (2020) Multi-isotope approaches for region-of-origin predictions of undocumented border crossers from the US–Mexico border: Biocultural perspectives on diet and travel history. In: Parra RC, Zapico SC, Ubelaker DH (eds) *Forensic Science and Humanitarian Action*, 1st edn. Wiley, pp 369–384

Bitter NQ, Fernandez DP, Driscoll AW, et al (2020) Distinguishing the region-of-origin of roasted coffee beans with trace element ratios. *Food Chemistry* 320:126602. <https://doi.org/10.1016/j.foodchem.2020.126602>

Bontempo L, van Leeuwen KA, Paolini M, et al (2020) Bulk and compound-specific stable isotope ratio analysis for authenticity testing of organically grown tomatoes. *Food Chemistry* 318:126426. <https://doi.org/10.1016/j.foodchem.2020.126426>

Chernyshev A, Braggins T (2020) Investigation of temporal apparent C4 sugar change in manuka honey. *Journal of Agricultural and Food Chemistry*. <https://doi.org/10.1021/acs.jafc.9b06965>

Chesson LA, Meier-Augenstein W, Berg GE, et al (2020) Basic principles of stable isotope analysis in humanitarian forensic science. In: Parra RC, Zapico SC, Ubelaker DH (eds) *Forensic Science and Humanitarian Action*, 1st edn. Wiley, pp 285–310

Cook GT, Dunbar E, Tripney BG, Fabel D (2020) Using carbon isotopes to fight the rise in fraudulent whisky. *Radiocarbon* 62:51–62. <https://doi.org/10.1017/RDC.2019.153>

Dailey-Chwalibóg T, Huneau J-F, Mathé V, et al (2020) Weaning and stunting affect nitrogen and carbon stable isotope natural abundances in the hair of young children. *Scientific Reports* 10:. <https://doi.org/10.1038/s41598-020-59402-8>

Doyle S (2019) A review of the current quality standards framework supporting forensic science: Risks and opportunities. *Wiley Interdisciplinary Reviews: Forensic Science*. <https://doi.org/10.1002/wfs2.1365>

Dunn PJH, Malinovsky D, Goenaga-Infante H (2020) Calibration hierarchies for light element isotope delta reference materials. *Rapid Communications in Mass Spectrometry* 34:. <https://doi.org/10.1002/rcm.8711>

Fry B, Carter JF (2019) Stable carbon isotope diagnostics of mammalian metabolism, a high-resolution isotomics approach using amino acid carboxyl groups. *PLOS ONE* 14:e0224297. <https://doi.org/10.1371/journal.pone.0224297>

Greule M, Moossen H, Lloyd MK, et al (2020) Three wood isotopic reference materials for  $\delta^2\text{H}$  and  $\delta^{13}\text{C}$  measurements of plant methoxy groups. *Chemical Geology* 533:119428. <https://doi.org/10.1016/j.chemgeo.2019.119428>

Juarez C, Ramey R, Flaherty DT, Akpa BS (2020) Utility of stable isotope ratios of tap water and human hair in determining region of origin in Central and Southern Mexico: Modeling relationships between  $\delta^2\text{H}$  and  $\delta^{18}\text{O}$  isotope inputs in modern Mexican hair. In: Parra RC, Zapico SC, Ubelaker DH (eds) *Forensic Science and Humanitarian Action*, 1st edn. Wiley, pp 345–367

Matos MPV, Jackson GP (2020) Compound-specific isotope analysis of human hair: Predicting behaviors and biometrics beyond dietary factors. *Analytical Chemistry*. <https://doi.org/10.1021/acs.analchem.9b04085>



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

## Contact Us

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Moloughney VP, Pinder DM, Pestle WJ (2020) Particle size matters: The effect of particle size on carbon and oxygen isotope composition of bone hydroxyapatite. *American Journal of Physical Anthropology*. <https://doi.org/10.1002/ajpa.24006>

Münster-Müller S, Scheid N, Zimmermann R, Pütz M (2020) Combination of stable isotope ratio data and chromatographic impurity signatures as a comprehensive concept for the profiling of highly prevalent synthetic cannabinoids and their precursors. *Analytica Chimica Acta* 1108:129–141. <https://doi.org/10.1016/j.aca.2020.01.029>

Nardoto GB, Sena-Souza JP, Chesson LA, Martinelli LA (2020) Tracking geographical patterns of contemporary human diet in Brazil using stable isotopes of nail keratin. In: Parra RC, Zapico SC, Ubelaker DH (eds) *Forensic Science and Humanitarian Action*, 1st edn. Wiley, pp 441–455

Perini M, Strojnik L, Paolini M, Camin F (2020) Gas chromatography combustion isotope ratio mass spectrometry for improving the detection of authenticity of grape must. *Journal of Agricultural and Food Chemistry* 68:3322–3329. <https://doi.org/10.1021/acs.jafc.9b05952>

Valenzuela LO, Chesson LA, Bowen G, et al (2020) Spatial distribution of stable isotope values of human hair: Tools for region-of-origin and travel history assignment. In: Parra RC, Zapico SC, Ubelaker DH (eds) *Forensic Science and Humanitarian Action*, 1st edn. Wiley, pp 385–410

Xu J, George AV, Salouros H (2020) Preparation and characterization of protected methylamphetamine and MDMA products. *Forensic Chemistry* 18:100210. <https://doi.org/10.1016/j.forc.2019.100210>