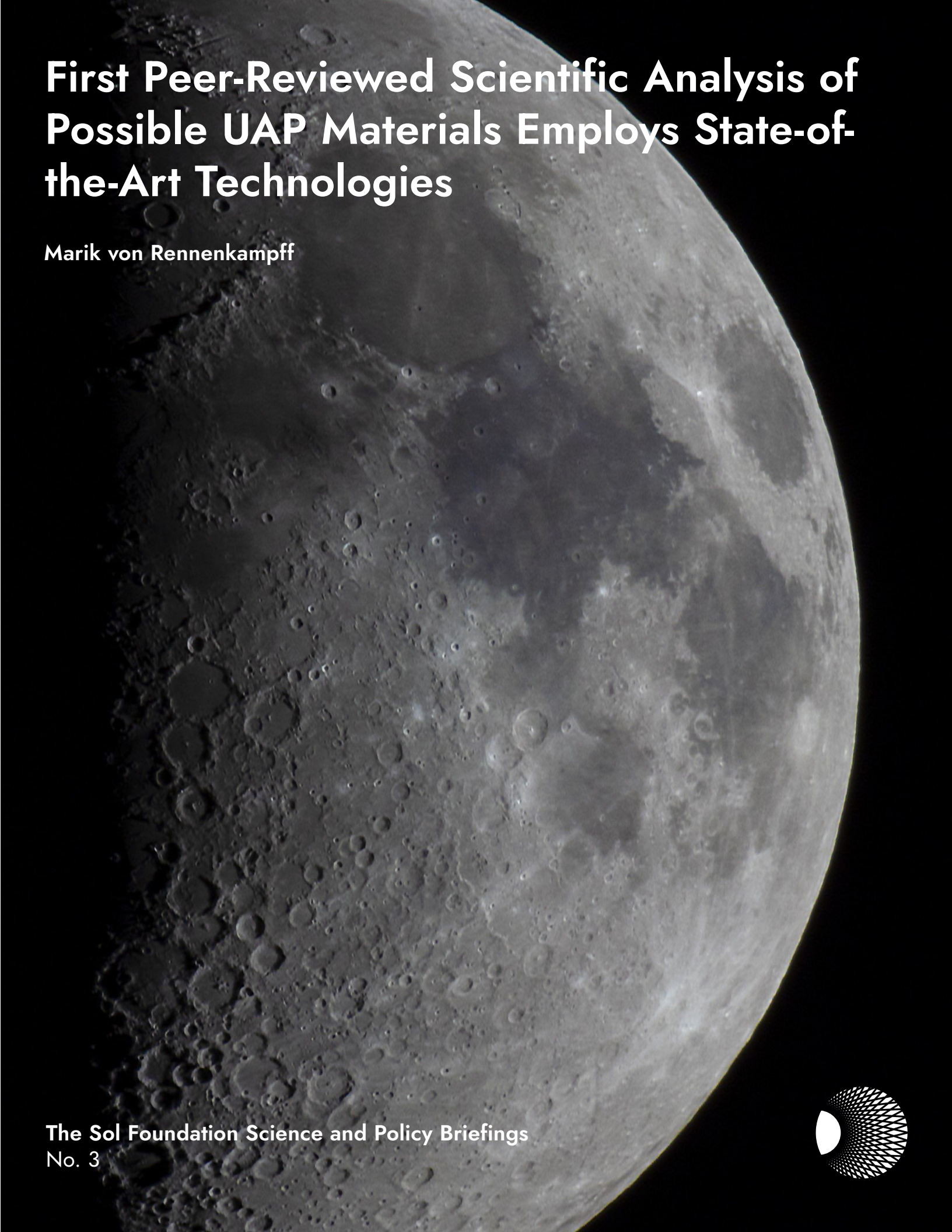
First Peer-Reviewed Scientific Analysis of Possible UAP Materials Employs State-of-the-Art Technologies

Marik von Rennenkampff



The Sol Foundation Science and Policy Briefings
No. 3

Contents

Executive Summary

Advanced atomic and isotopic analysis techniques can play a vital role in UAP forensics. In the first peer-reviewed analysis of physical materials associated with a multi-witness UAP event, Stanford immunologist Garry P. Nolan and a group of scientists, including information scientist and pioneering UAP researcher Jacques Vallée, utilized state-of-the-art materials analysis technologies to examine the remnants of a mass of molten metal observed descending to the ground in Council Bluffs, Iowa, in 1977.[1] Analysis of the sample found that while its isotopic ratios contain no anomalies, the various metals within the once-molten mass are mixed incompletely, indicating an industrial process of unknown, and potentially perplexing, origin. Various prosaic explanations for the inhomogeneous mass of molten metal, such as a meteorite impact or debris from a satellite, spacecraft, or aircraft, were ruled out. Hoax or prank explanations are not supported by the advanced elemental and isotopic analyses and are difficult to reconcile with the multiple independent accounts of a reddish-orange luminous mass descending to the ground. The groundbreaking, peer-reviewed analysis sets an important standard for how rigorous scientific methods and cutting-edge materials analysis technologies can and should be applied to the study of UAP in the future.

1. The Council Bluffs Incident

On the evening of December 17, 1977, five independent groups of witnesses observed a red, luminous mass descending from approximately 500–600 feet to the ground in the vicinity of a park in Council Bluffs, Iowa.[2] One witness observed "a big round thing hovering in the sky below the tree tops."[3] "It was hovering, it wasn't moving," he claimed, and had "red lights around the perimeter . . . blinking in sequence."[4] Another witness, one of the first to the scene, described a pool of molten metal that "looked like a great big sparkler at first."[5] "Then," the witness stated, "it cooled down, and it seemed like lava, glowing and bubbling."[6] The city's assistant fire chief arrived approximately twenty minutes later and described the roughly four by six-foot mass of molten metal as "running, boiling down the edges of the levee."[7] Police took photographs of the scene—one of which is included in Nolan's and Vallée's peer-reviewed study—and interviewed witnesses. Materials analyses of the metal conducted in the weeks after the incident found that it consisted of high-carbon steel and slag, products of common industrial processes.[8]

2. Advanced Materials Analysis: SIMS and MIBI

In 2021, scientists led by Stanford University professor Garry P. Nolan employed two advanced atomic and isotopic analysis methods to examine samples from the Council Bluffs incident. First, Nolan and his team used secondary ion mass spectroscopy (SIMS), which determines a sample's elemental, isotopic, and molecular composition with extreme sensitivity by bombarding it with an ion beam. Nolan and his colleagues then utilized multiplexed ion beam imaging (MIBI), an innovative analysis technique pioneered at the Stanford University School of Medicine by Michael Angelo, Sean Bendall, and Nolan. MIBI allows researchers to visualize

precise spatial distributions and architectures of elements and isotopes,[9] including in three dimensions, and was originally developed to detect the presence of trace levels of lanthanide series isotopes from the "rare-earth" section of the periodic table of elements. These cutting-edge technologies and techniques were considered suitable to analyze the Council Bluffs samples at a resolution of two hundred nanometers in the XY dimension and in five nanometer continuous increments in the Z plane.[10] No research of this nature has previously been published on materials of such alleged provenance as the Council Bluffs samples or other alleged UAP materials.

The SIMS and MIBI analyses found no anomalous isotopic values, indicating that the Council Bluffs samples could have originated on Earth. However, the analyses also found that the various metals within the once-molten mass were mixed incompletely. This inhomogeneous state indicates an industrial process of unknown, and potentially perplexing, origin. Given the puzzling nature of the 1977 incident, including independent eyewitness accounts of a luminous mass descending to the ground, Nolan, Vallée, and their team evaluated various hypotheses for the intriguing presence of a large, molten metallic mass in the vicinity of a city park.

3. Materials Analyses Aid Hypothesis Evaluation

Proposed explanations for the Council Bluffs incident ranged from a meteorite impact and debris from a satellite, spacecraft, or aircraft to a hoax or prank. Scientists ruled out the various impact hypotheses, and a hoax or prank is unsupported by the state-of-the-art materials analysis techniques described above.

Meteorite: No cratering, which is observed in meteorite impacts, occurred at the scene. Additionally, a meteorite with the approximate mass of the metal found there would not have impacted in a molten state. Last, the Council Bluffs material does not have the elemental composition of meteorites.[11]

Satellite/Spacecraft Debris: Reentering satellite or spacecraft debris cools and solidifies prior to impact rather than reaching Earth in a molten state. There were also no indications of structure found in the Council Bluffs debris, which is unlike satellite or spacecraft components. Carbon steel, the primary component of the Council Bluffs sample, is also heavy and not typically employed in satellite or spacecraft construction.

Aircraft Debris: No plausible incident involving falling aircraft debris would result in a substantial mass of molten steel. Moreover, no airports or military facilities in the region reported aviation incidents or accidents before, during, or after the incident.

Dumped Molten Metal: The technical and logistical challenges associated with melting a mass of metal to >2,500°F, transporting it, and dumping it at the incident location undetected are formidable. Additionally, no foundries in the region were operating on the day of the incident, nor is such a "dumping" scenario easily reconcilable with the multiple, independent eyewitness accounts of a luminous mass descending to the ground.

Thermite: Some individuals have claimed responsibility for the incident as a hoax or prank involving thermite railroad welding equipment. However, the necessary byproduct of a thermite reaction (aluminum oxide[12]) is not observed in the advanced materials analyses described above. As with the "dumping" hypothesis, a thermite prank or hoax explanation is also difficult to reconcile with the multiple, independent eyewitness accounts of a luminous mass descending from a structured object some hundreds of feet above the site.

Conclusions & Implications for Future Scientific Analyses

State-of-the-art atomic and isotopic analysis techniques can play a vital role in UAP forensics. By subjecting samples from the 1977 Council Bluffs, Iowa, UAP incident to secondary ion mass spectroscopy and multiplexed ion beam imaging, Nolan, Vallée, and their colleagues determined that the metals in the once-molten mass discovered by witnesses were mixed incompletely. This inhomogeneous state suggests an industrial process of unknown, and potentially perplexing, origin. Not only have researchers ruled out prosaic explanations such as a meteorite impact or a satellite, spacecraft, or aircraft-related debris impact for the presence of a large mass of molten metal in the vicinity of a city park, the observed atomic and isotopic composition of the sample is inconsistent with a hoax or prank. This groundbreaking, peer-reviewed analysis sets an important standard for how rigorous scientific methods and cutting-edge materials analysis technologies can and should be applied to the study of UAP in the future.

About the Author

Marik von Rennenkampff is a noted public commentator and analyst of UAP affairs. He served as appointee in the US Department of Defense during the Obama administration and later worked in the US State Department. He delivers the Sol Briefing, the Sol Foundation's monthly update on UAP news, and has been a regular contributor to *The Hill*.

Notes

1. Garry P. Nolan, Jacques F. Vallée's, Sizun Jiang, and Larry G. Lemke, "Improved Instrumental Techniques, Including Isotopic Analysis, Applicable to the Characterization of Unusual Materials with Potential Relevance to Aerospace Forensics," *Progress in Aerospace Sciences* 128 (2022).
2. Richard Warner, "'Close Encounter' at Big Lake Park," Historical Society of Pottawattamie County, https://www.thehistoricalsociety.org/h/ufo.html.
3. Greg Jerrett, "Mystery at Big Lake: Fire in the Sky," *Daily Nonpareil* (Council Bluffs, IA), May 16, 2004.
4. Jerrett, "Mystery at Big Lake."
5. Jerrett, "Mystery at Big Lake."
6. Jerrett, "Mystery at Big Lake."
7. *Daily Nonpareil* (Council Bluffs, IA), "Mystery Metal Falls from Sky," December 18, 1977.
8. Bud Appleby, "Chunk of Molten Metal Found in Bluffs Has Residents Puzzled," *Des Moines Register*, January 26, 1978.
9. MIBI is primarily utilized in medical research to image proteins, nucleic acids, and biomarkers spatially.
10. For comparison, a human hair is around 100,000 nanometers wide and a red blood cell is around 7,000 nanometers in diameter.
11. Iron meteorites contain 5–40% nickel; the Council Bluffs sample had only trace amounts of nickel.
12. Aluminum oxide (and other oxides from other metals) would have been observed as a "diatomic" in the SIMS analysis.

Bibliography

Appleby, Bud. "Chunk of Molten Metal Found in Bluffs Has Residents Puzzled." *Des Moines Register*. January 26, 1978.

Jerrett, Greg. "Mystery at Big Lake: Fire in the Sky." *Daily Nonpareil* (Council Bluffs, IA), May 16, 2004.

"Mystery Metal Falls from Sky." *Daily Nonpareil* (Council Bluffs, IA), December 18, 1977.

Nolan, Garry P., Jacques F. Vallee, Sizun Jiang, and Larry G. Lemke. "Improved Instrumental Techniques, Including Isotopic Analysis, Applicable to the Characterization of Unusual Materials with Potential Relevance to Aerospace Forensics." *Progress in Aerospace Sciences* 128 (2022). https://www.sciencedirect.com/science/article/abs/pii/S0376042121000907.

Warner, Richard. "'Close Encounter' at Big Lake Park." Historical Society of Pottawattamie County. https://www.thehistoricalsociety.org/h/ufo.html.

The Sol Foundation
www.thesolfoundation.org
information@thesolfoundation.org

Cofounders: Dr. Garry Nolan, Dr. Peter Skafish

Design: Isaac Lopez, Monarch Digital