

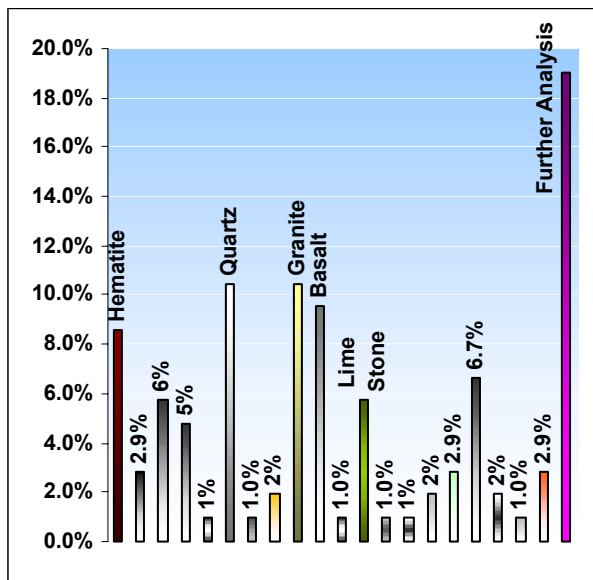
**DEVELOPMENT OF A DIGITAL METEORITE IDENTIFICATION PROGRAM AT UNIVERSITY OF NEW MEXICO (UNM) (Institute of Meteoritics) AND SOUTHWESTERN INDIAN POLYTECHNIC INSTITUTE (SIPI).** R. Gakin<sup>1</sup>, K. Lewis<sup>1</sup>, J Simmons<sup>1</sup>, K Gchachu<sup>1</sup>, <sup>1</sup>Southwestern Indian Polytechnic Institute, Albuquerque, NM 87184, [Gankdogg@aol.com](mailto:Gankdogg@aol.com), [jsimmons@sipi.bia.edu](mailto:jsimmons@sipi.bia.edu), J.M.Karner<sup>2</sup>, H.E. Newsom<sup>2</sup>, R.H.Jones<sup>2</sup>, <sup>2</sup>University of New Mexico, Institute of Meteoritics and Department of Earth and Planetary Sciences, Albuquerque, NM 87131, [newsom@unm.edu](mailto:newsom@unm.edu)

**Introduction:**

Determining the origin and chemical composition of suspect extra terrestrial specimens has lead to meteorite identification research programs. Such programs, like the University of New Mexico-Southwestern Indian Polytechnic Institute partnership, are being inundated with many non-meteorites (meteor wrongs) sent in by interested individuals from all over the world.

The SEM gives the chemical compound composition (CCC's) of the sample. This analysis determines if the sample has terrestrial or extra terrestrial origin.

**SAMPLE PERCENTAGES**



**Fig. 1** Percentage analysis of samples received, during August 2002 – January 2003.

This meteorite identification program developed a spreadsheet that aids in identifying the types of minerals in a sample for physical properties, possible meteorite characteristics, minerals and rock properties, and possible man made characteristics. Samples that show meteorite distinctiveness are further analyzed via the Scanning Electron Microprobe (SEM).

**SUSPECT METEORITE IDENTIFICATION**  
 UNIVERSITY OF NEW MEXICO  
 INSTITUTE OF METEORITICS  
 SOUTHWESTERN INDIAN POLYTECHNIC INSTITUTE

Sample #: \_\_\_\_\_  
 Person: \_\_\_\_\_ Checked by: \_\_\_\_\_  
 Locality: \_\_\_\_\_  
 Inspected by: R. Gakin, K. Lewis

**INTERNAL SURFACE** **EXTERNAL SURFACE:**

**METEORITE CHARACTERISTICS:** **SAMPLE:**  
 Chondrules: \_\_\_\_\_ Date of Photo: \_\_\_\_\_  
 Fusion Crust: \_\_\_\_\_  
 Presence of Iron-Nickel Metal: \_\_\_\_\_  
 SEM EDS results if applicable: \_\_\_\_\_

**PHYSICAL PROPERTIES:**  
 Magnetism: \_\_\_\_\_  
 Color: \_\_\_\_\_  
 Luster: \_\_\_\_\_  
 Vein/Grain: \_\_\_\_\_  
 Mohs Hardness: \_\_\_\_\_  
 Talc: \_\_\_\_\_  
 Dent: \_\_\_\_\_  
 Lach: \_\_\_\_\_  
 Density: \_\_\_\_\_  
 Weight: \_\_\_\_\_  
 Volume: \_\_\_\_\_  
 Specific Gravity: \_\_\_\_\_

**MINERALOGICAL CHARACTERISTICS: (IF APPLICABLE)**  
**GENERAL:** **MISCELLANEOUS PROPERTIES:**  
 General: \_\_\_\_\_ Structure: \_\_\_\_\_ Breccias: \_\_\_\_\_ Porphyritic: \_\_\_\_\_  
 Foliated: \_\_\_\_\_ Columnar: \_\_\_\_\_ Polyhedral: \_\_\_\_\_  
 Mass: \_\_\_\_\_ Foliation: \_\_\_\_\_ Columnar: \_\_\_\_\_ Foliated: \_\_\_\_\_  
 Vein: \_\_\_\_\_  
 Color: \_\_\_\_\_  
 Luster: \_\_\_\_\_  
 Top: \_\_\_\_\_  
 Bottom: \_\_\_\_\_

**MAN-MADE CHARACTERISTICS:**  
 Iron: \_\_\_\_\_  
 Steel: \_\_\_\_\_  
 Aluminum: \_\_\_\_\_  
 Brass: \_\_\_\_\_  
 Copper: \_\_\_\_\_  
 Lead: \_\_\_\_\_  
 Zinc: \_\_\_\_\_  
 Tin: \_\_\_\_\_  
 Silver: \_\_\_\_\_  
 Gold: \_\_\_\_\_  
 Glass: \_\_\_\_\_  
 Plastic: \_\_\_\_\_  
 Other: \_\_\_\_\_

**MINERALS PRESENT:** **MATERIALS OFTEN MISTAKEN FOR METEORITES**  
 Chert: \_\_\_\_\_ Iron: \_\_\_\_\_  
 Pyrite: \_\_\_\_\_ Hematite: \_\_\_\_\_  
 Dolomite: \_\_\_\_\_ Magnetite: \_\_\_\_\_  
 Mica: \_\_\_\_\_ Pyroxene: \_\_\_\_\_  
 Quartz: \_\_\_\_\_  
 Olivine: \_\_\_\_\_

**CONCLUSION:** General Rock Type: \_\_\_\_\_

**Fig. 2** Digital checklist developed by SIPI Emerging Scholar Interns to make meteor identification more efficient.

Further modification of the digital checklist will prove more efficient in maintaining records and information. This checklist is easily transferable through E-mail and will be obtainable from our future website to keep program supervisors, interns, and owners of samples well informed of the progress made on a particular sample. This is also sent back to the owner to verify reception, thorough investigation, and the basis for the conclusion(s).

## METEORITE IDENTIFICATION R.Gakin, K.Lewis, J.Simmons

This form helps the owner to perform his or her own field examination of further specimen samples. This checklist, along with the website, are tools that will assist in determining meteorites from meteor-wrongs, thereby saving time, money and disappointment for both the program personnel and the sample owner. If these tools are successful they will set a standard system for meteorite identification.



Stony iron meteorite



**Fig. 3** Common non-meteorite suspect samples received.

To date, SIPI's Native American student participants in the UNM/SIPI partnership, have greatly broadened their horizons in the STEM fields. Specific benefits have included learning more effective research skills, becoming familiar with cutting edge tools (SEM), increased knowledge of geology, becoming much more comfortable with doing presentations before groups, as well as greatly increased personal confidence initiatives and serious approach to class work in general. This program has allowed junior college students opportunities that usually are only open to four- year college students. This reinforces the "I can be anything I want" attitude.



**Fig. 4** Interns attended the NASA PAIR Summit in Washington DC.

**Training** for SIPI students played a key role in the development in each of their specialized roles. The UNM/SIPI partnership offered students many opportunities for extensive training using the state of the art SEM among other skills acquired in various fields including geology, and computer computation. Various fieldtrips also played an immense role in their preparation. The NASA OSS MURED program has successfully bridged the gap between students and professionals alike. Students are more proactive in fulfilling academic dreams and are more likely to succeed within their fields of study.



**Fig 5.** SIPI undergraduates working on SEM.

**References:** [1] Newsom, H.E., et al. (2002), *LPS XXXIII*, #1855. [2] Karner, J. M., Jones, R.H.

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