### OSAC RESEARCH NEEDS ASSESSMENT FORM

**Title of research need:** 3D Imaging of patterned injuries on human skin

**Keyword(s):** 3D scanning, 3D photography, color, documentation, database, superimposition

**Submitting subcommittee(s):** Odontology  
**Date Approved:** 08 24 2016

*If SAC review identifies additional subcommittees, add them to the box above.*

### Background Information:

1. **Description of research need:**

   Current assessment tools for patterned injuries involve considerable potential for error, such as physical contact of impression materials which may distort tissues, 2D photography which has intrinsic errors depending on distance and lighting, and subjective expert opinion. 3D methods are available, but need to be optimized for use on mobile devices (e.g., smartphones and multi-camera systems) and tested for dimensional and color accuracy and ease-of-use. Software is needed for efficient archiving and retrieval, as well as superimposition and matching functions. Comparisons are needed between 3D and current methods preferably in black box experiments.

2. **Key bibliographic references relating to this research need:**


   [https://www.dental-monitoring.com](https://www.dental-monitoring.com) (Smartphone app for measuring tooth positions)


3a. In what ways would the research results improve current laboratory capabilities?

The proposed research topics would simplify data acquisition, automate data processing, reduce investigator and staff time, reduce errors, increase details related to severity and healing of the injuries.

3b. In what ways would the research results improve understanding of the scientific basis for the subcommittee(s)?

The proposed research topics would simplify data acquisition, automate data processing, reduce investigator and staff time, reduce errors, increase details related to severity and healing of the injuries.

3c. In what ways would the research results improve services to the criminal justice system?

The work would lead to better protocols, establishment of standards for documentation, better understanding of the natural history and causes of patterned injuries, improved expert witness testimony.

4. Status assessment (I, II, III, or IV):

| Suitability of mobile devices for documentation of patterned injuries | Major gap in current knowledge |
| Protocols for 3D digital imaging (scanning, photography) for patterned images, especially to methods involving physical contact such as impressions. | Minor gap in current knowledge |
| Availability of archived and accessible 3D databases of patterned injuries (causes, healing, etc.) and methods of superimposing/matching images. | No or limited current research is being conducted |

This research need has been identified by one or more subcommittees of OSAC and is being provided as an informational resource to the community.
## Approvals:

### Subcommittee

| Approval date: | 08 24 2016 |

(Approval is by majority vote of subcommittee. Once approved, forward to SAC.)

### SAC

1. Does the SAC agree with the research need?  
   - Yes [ ]  
   - No [ ]

2. Does the SAC agree with the status assessment?  
   - Yes [ ]  
   - No [ ]

   If no, what is the status assessment of the SAC: [ ]

| Approval date: | [ ] |

(Approval is by majority vote of SAC. Once approved, forward to NIST for posting.)