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**OSAC 2024-S-0022**  
**Method for Determining**  
**Directionality of Individual**  
**Spatter Stains in Bloodstain**  
**Pattern Analysis**

Bloodstain Pattern Analysis Subcommittee  
Physics/Pattern Interpretation Scientific Area Committee (SAC)  
Organization of Scientific Area Committees (OSAC) for Forensic Science



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## OSAC Proposed Standard

# DRAFT OSAC 2024-S-0022 Method for Determining Directionality of Individual Spatter Stains in Bloodstain Pattern Analysis

Prepared by  
Bloodstain Pattern Analysis Subcommittee  
Version: 1.0  
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### Disclaimer:

This OSAC Proposed Standard was written by the Bloodstain Pattern Analysis Subcommittee of the Organization of Scientific Area Committees (OSAC) for Forensic Science following a process that includes an [open comment period](#). This Proposed Standard will be submitted to a standard developing organization and is subject to change.

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The STR consists of an independent and diverse panel, which may include subject matter experts, human factors scientists, quality assurance personnel, and legal experts as applicable. The

57 selected group is tasked with evaluating the proposed standard based on a defined list of  
58 scientific, administrative, and quality assurance based criteria.

59 For more information about this important process, please visit our website  
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61 technical-review-str-process](https://www.nist.gov/organization-scientific-area-committees-forensic-science/scientific-technical-review-str-process)

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131 **Method for Determining Directionality of Individual Spatter Stains in Bloodstain Pattern**  
132 **Analysis**

133  
134 **1 Scope**

135 Spatter stains are deposited on a surface after blood drops move through the air. Determining  
136 the directionality of these stains can be used in many aspects of bloodstain pattern analysis,  
137 including but not limited to aiding in pattern classification, event reconstruction, interpretation,  
138 and establishing an area of convergence.

139  
140 This document provides the steps required to determine the direction in which a blood drop was  
141 moving relative to the surface at the time of deposition. This method applies to spatter stains  
142 and does not apply to bloodstains created through a swipe or wipe mechanism.

143  
144 **2 Terms and Definitions**

145 **2.1**  
146 **directionality**

147 Characteristic of a spatter stain that indicates the direction blood was moving at the time of  
148 deposition.

149  
150 **2.2**  
151 **leading edge**

152 The side of the spatter stain where the blood first impacts the surface and initiates the movement  
153 relative to the surface.

154  
155 **2.3**  
156 **major axis**

157 The longest line segment within an elliptical stain (length).

158  
159 **2.4**  
160 **trailing edge**

161 The side of the stain that is influenced by the cessation of blood movement relative to the  
162 surface.

163  
164 **3 Determining the Directionality of a Spatter Stain**

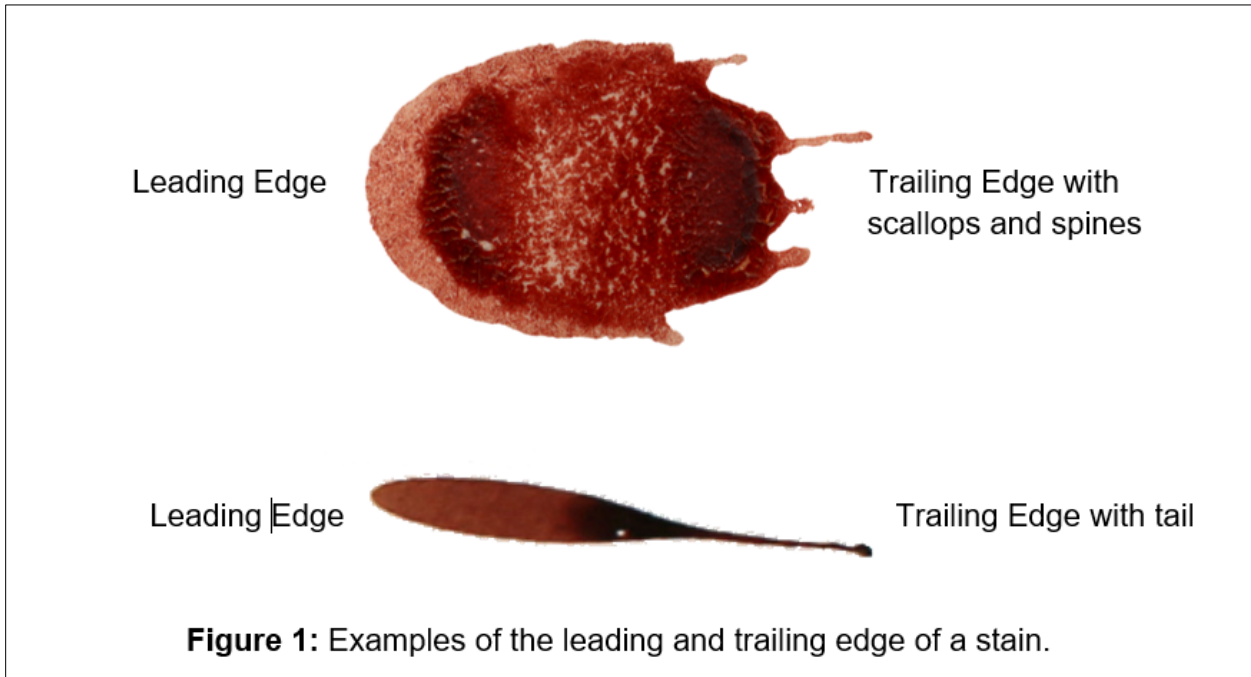
165 The analyst shall:

166  
167 **3.1** Choose stains with well-defined edges and avoid stains that have the potential to be  
168 distorted due to the substrate, mixed with tissue, clots, or foreign materials, or are overlapping  
169 with other spatter patterns.

170

171 **3.2** Examine the elliptical stain in relation to its major axis. Identify the edge of the stain with  
172 relatively smooth edges in comparison to other portions of the edges of the same stain; the  
173 leading edge. Identify the edge of the stain with non-smooth characteristics such as scallops,  
174 spines, or tail(s); the trailing edge (see Figure 1).

175

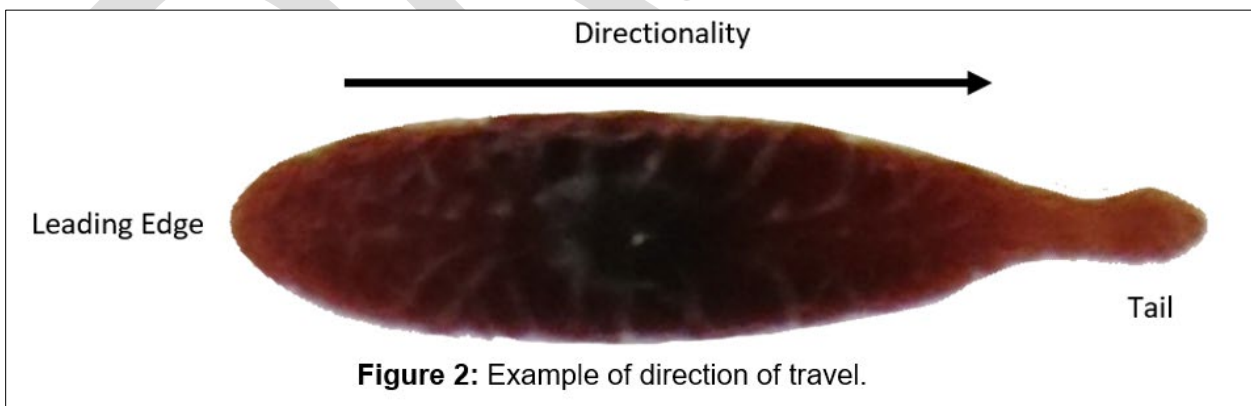


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177

178 **3.3** Establish directionality of the stain as the direction that the major axis of the ellipse  
179 extends from the leading edge toward the trailing edge (see Figure 2).

180



181

182

183 **3.4** Either:

184

185 a) Describe the qualitative directionality of the stain relative to the substrate on which they  
186 are located (vertical, horizontal, or surfaces of varying angles or movable surfaces), and

187 in a manner that is easily understood (e.g., “upwards and to the left”, “to the northwest”).  
188 Or,  
189 b) Describe the quantitative directionality of the stain by measuring the gamma angle ( $\gamma$ ).  
190 The gamma angle is the angle between the major axis of the ellipse on the spatter stain  
191 and a defined reference line (directed line segment) on the target (see Figure 3). This  
192 requires validated computer software, level to create a plumb line on a vertical surface,  
193 and/or protractor.  
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**Annex A**  
(informative)

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