

Venenerkennung hacken

Eine Geschichte vom Fall der letzten Bastion biometrischer Systeme



Julian

donblob@posteo.org

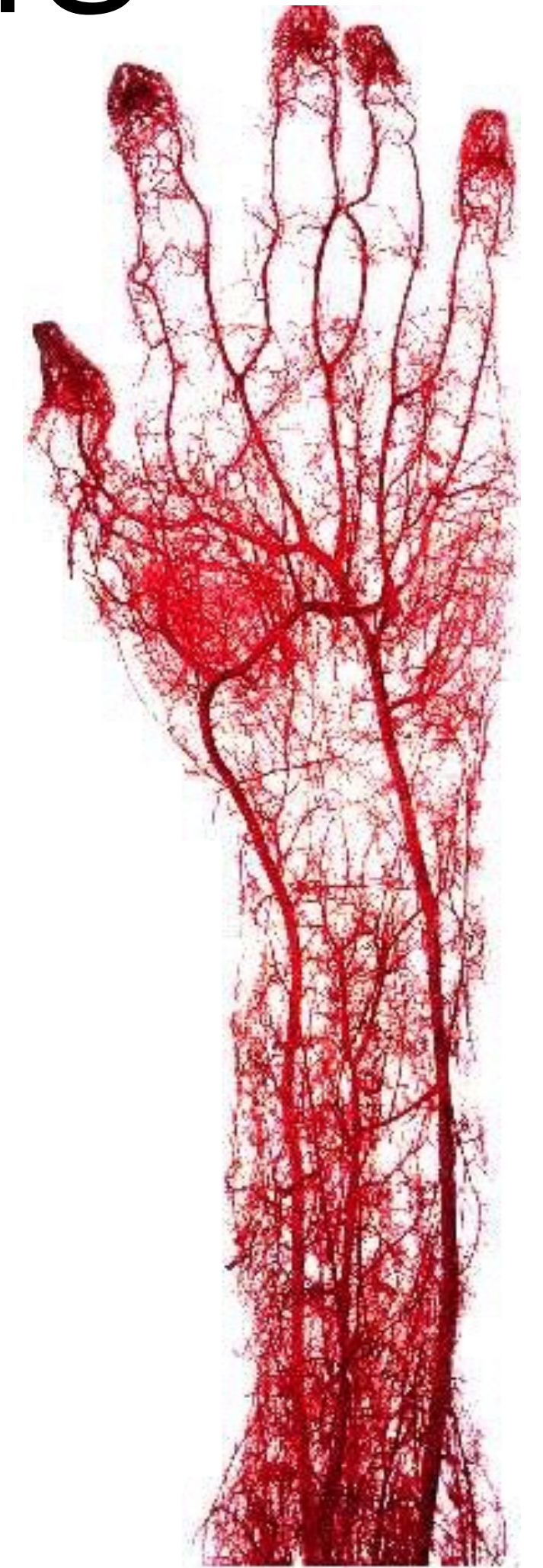
[@starbug_pub](https://twitter.com/starbug_pub)
starbug@ccc.de



starbug

Entwicklung des Merkmals

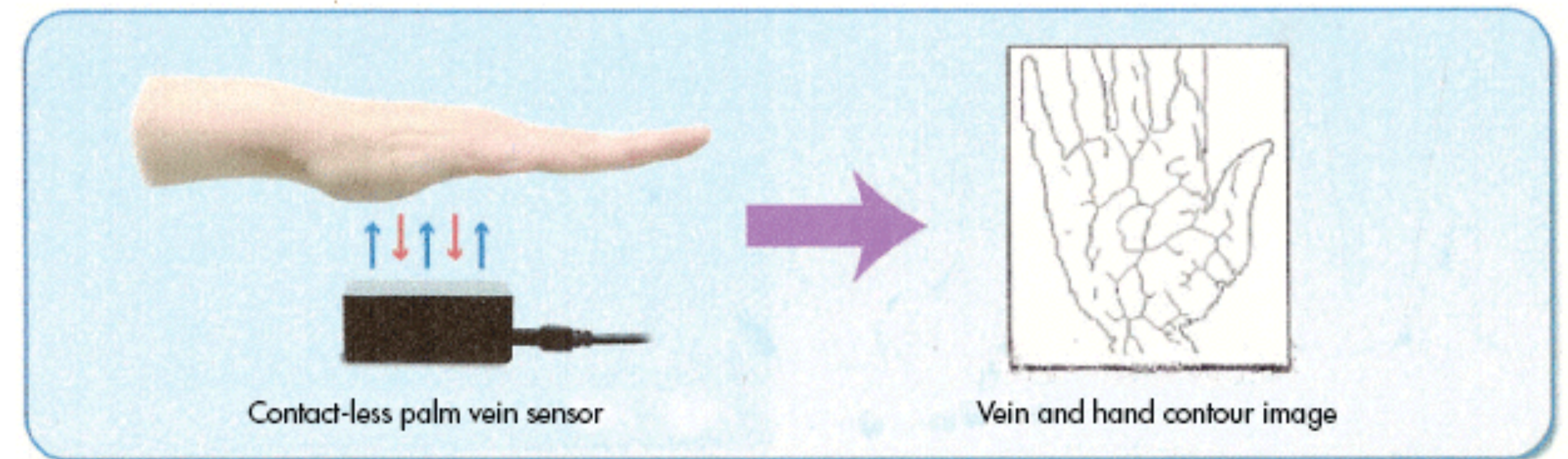
- Blutgefäße entwickeln sich in der sechsten Schwangerschaftswoche
- Grobverlauf ist genetisch bestimmt
- Finale Ausprägung durch Zufallsprozesse



how it works (hardware)

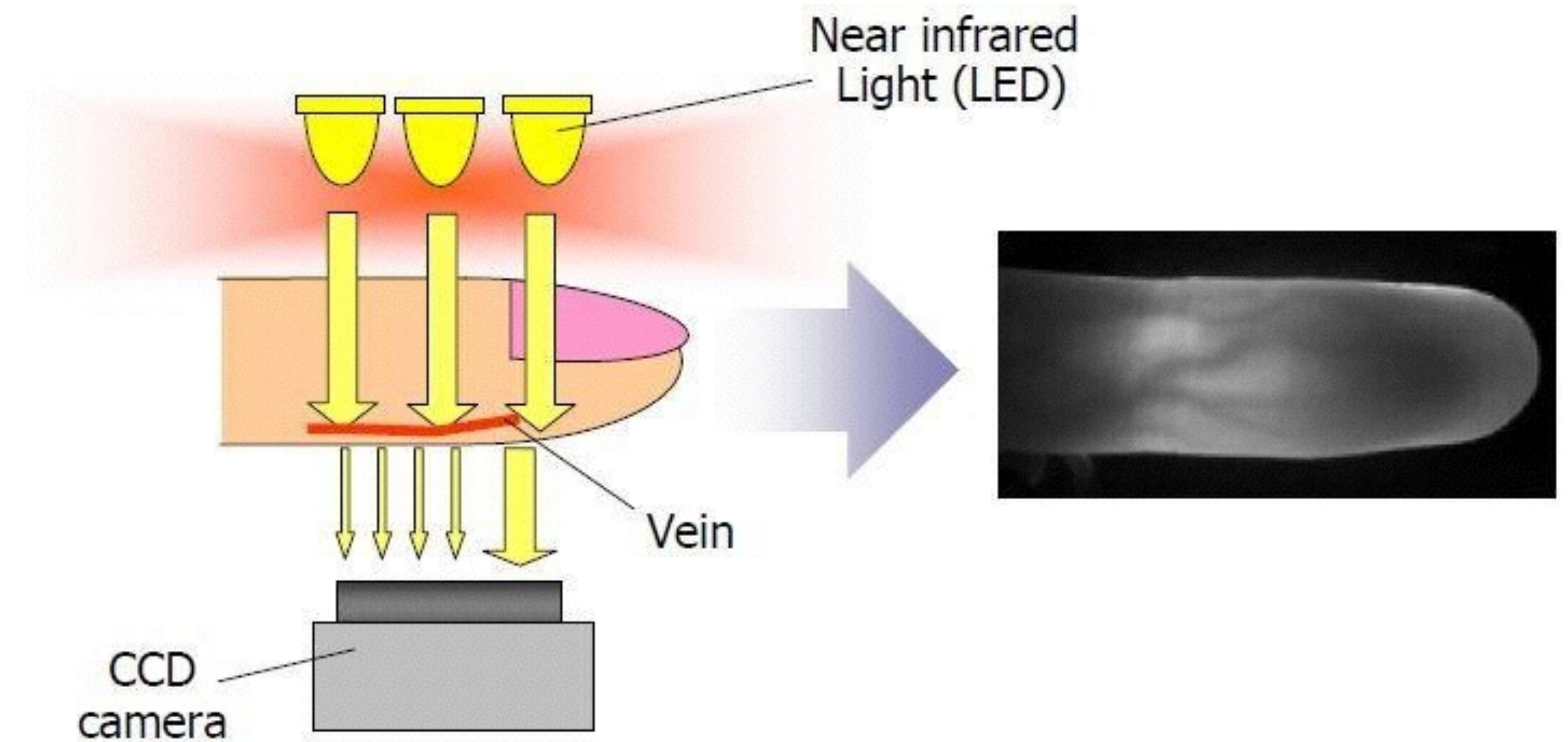


6. In Fujitsu's Palm Secure technology for biometrics, contact-less palm-vein sensing can be used to project a vein and hand contour image.



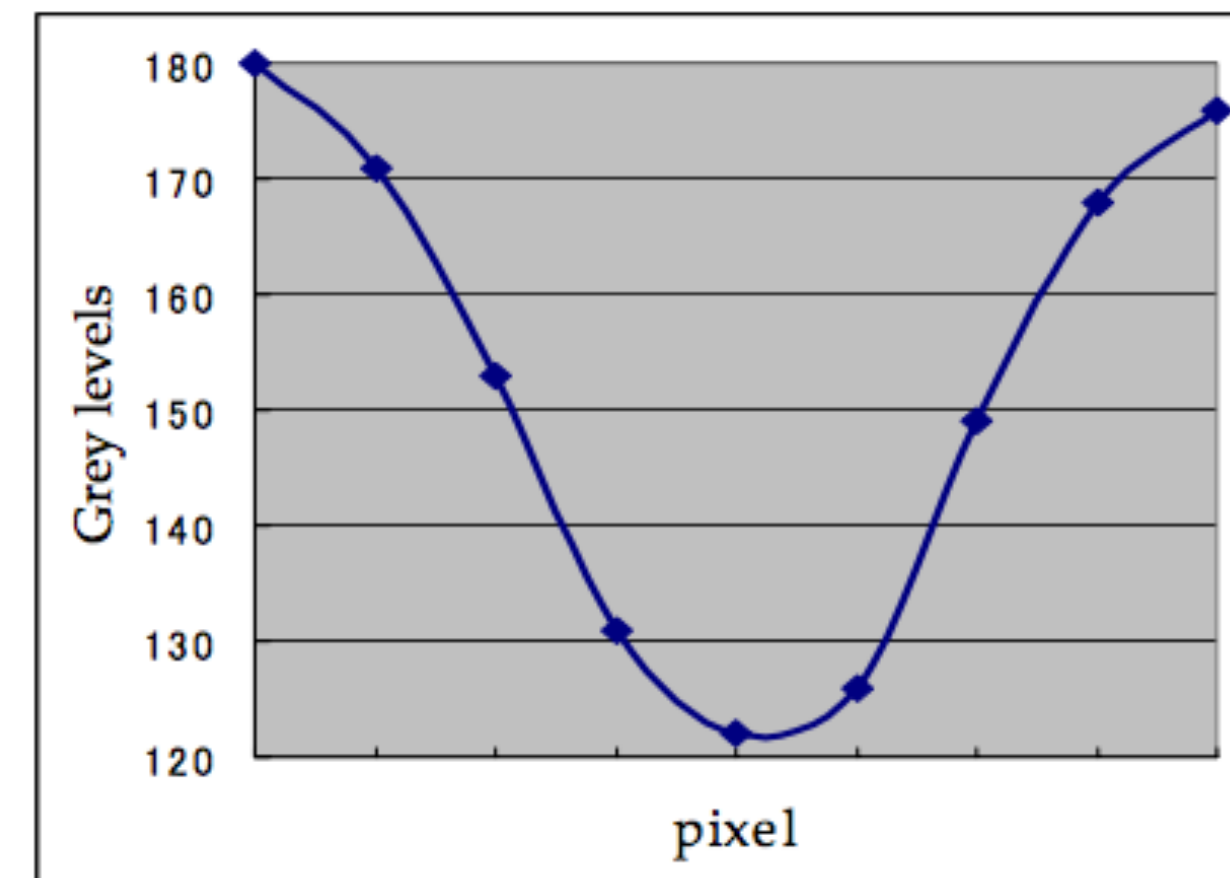
<http://www.fujitsu.com/>

how it works (hardware)

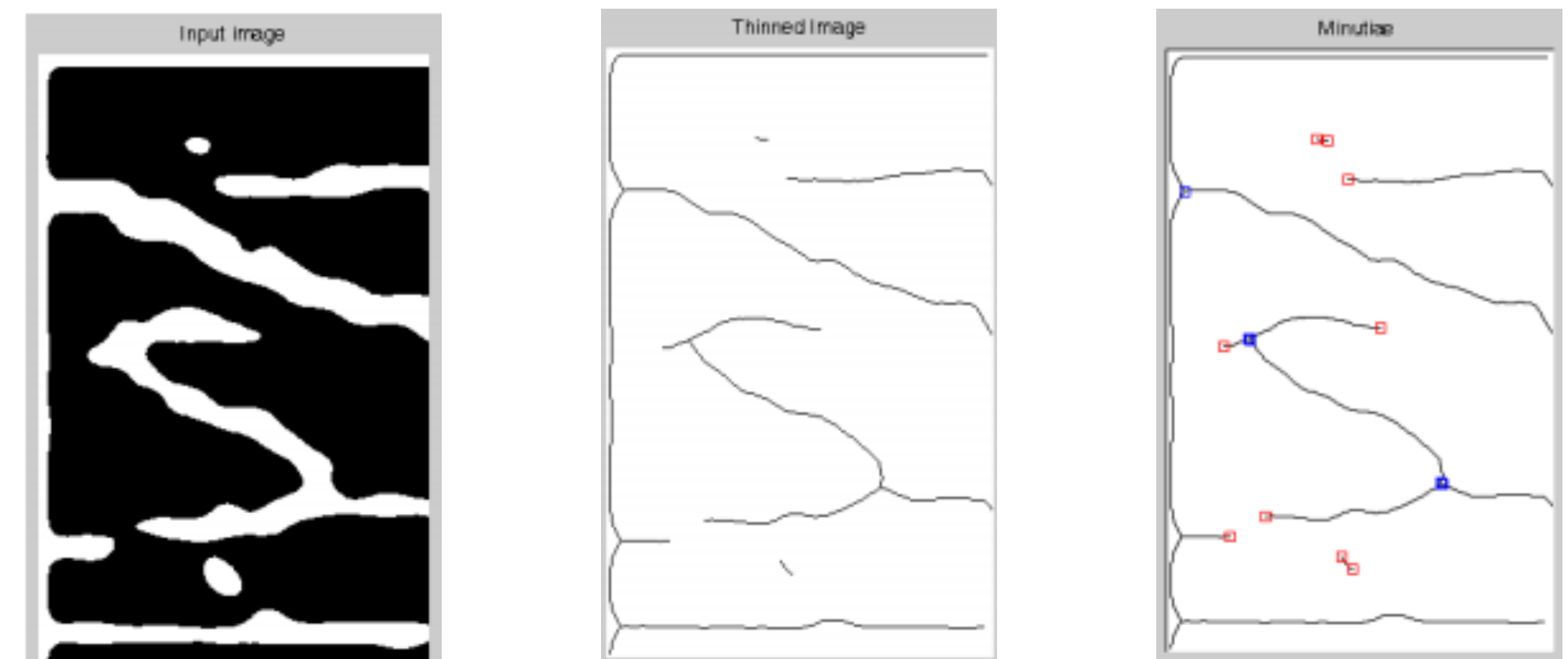


how it works (software)

- Extraktion: Miura tracking
- Postprocessing: Skelettonisierung
- Verwendete Merkmale:
 - Enden
 - Aufspaltungen



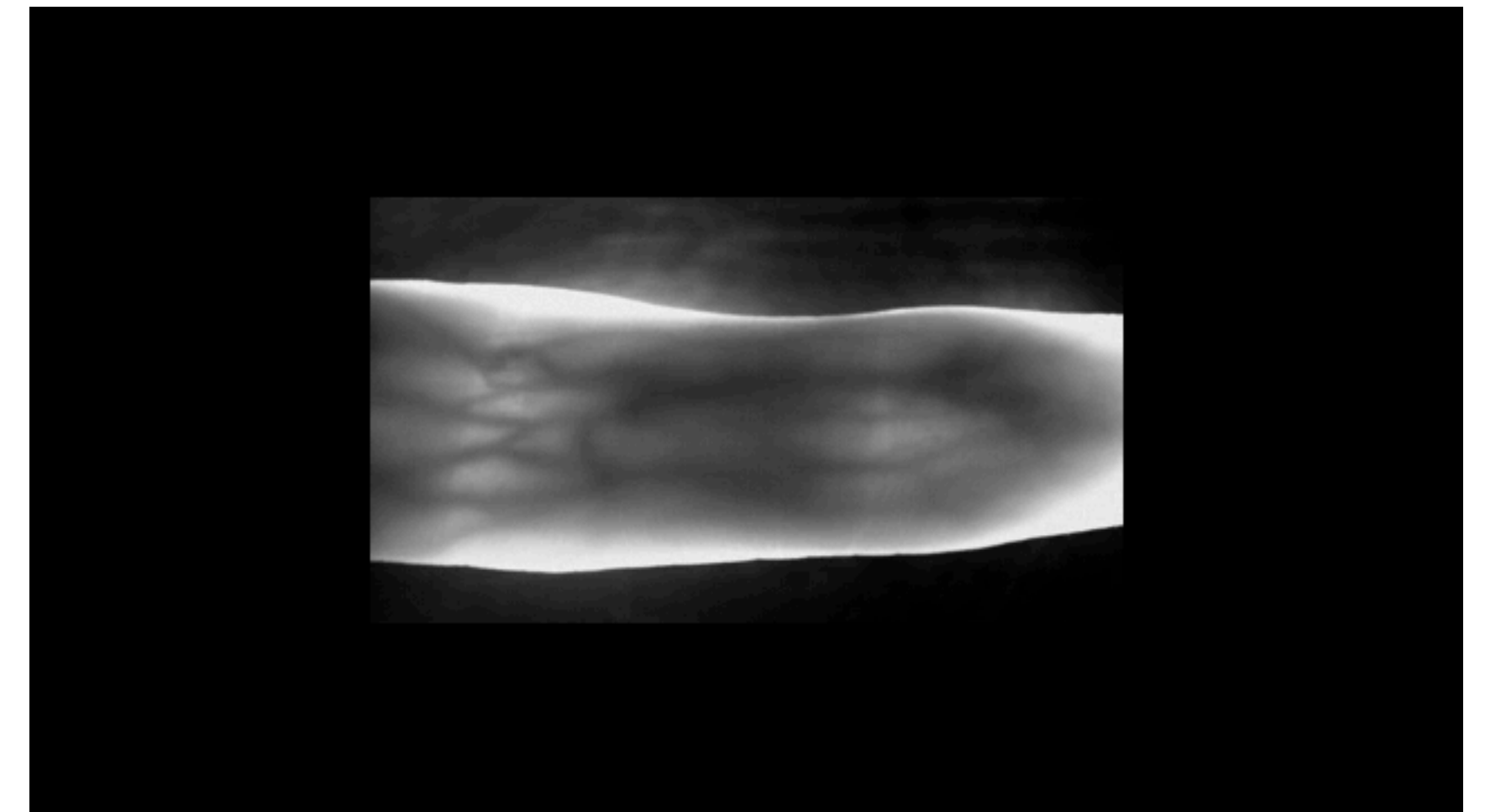
<https://de.mathworks.com/matlabcentral/profile/authors/1836574-bram-ton>



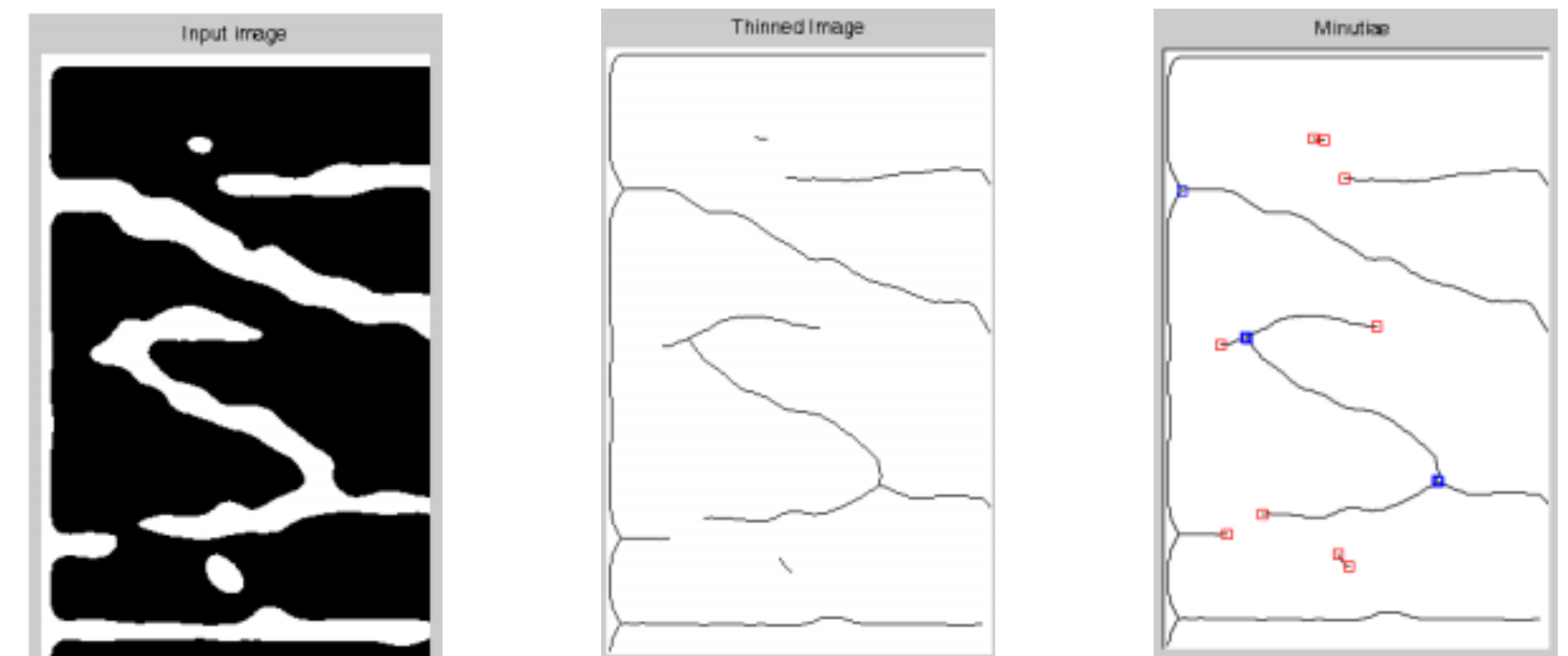
<https://www.irjet.net/archives/V4/i4/IRJET-V4I4266.pdf>

how it works (software)

- Extraktion: Miura tracking
- Postprocessing: Skelettonisierung
- Verwendete Merkmale:
 - Enden
 - Aufspaltungen



<https://de.mathworks.com/matlabcentral/profile/authors/1836574-bram-ton>



<https://www.irjet.net/archives/V4/i4/IRJET-V4I4266.pdf>

where to look

- Computer
- Krankenhäuser
- Geldautomaten
- ...



https://m.smedata.sk/api-media/media/image/sme/8/44/44788/44788_1200x.jpg
<https://www.blog-nouvelles-technologies.fr/wp-content/uploads/2018/02/palm-vein-scan-2.jpg>
<http://vietnamsmart.vn/images/tintuc/ACCESS-CONTROL-2.png>

where to look

- Computer
- Krankenhäuser
- Geldautomaten
- und beim BND :-D

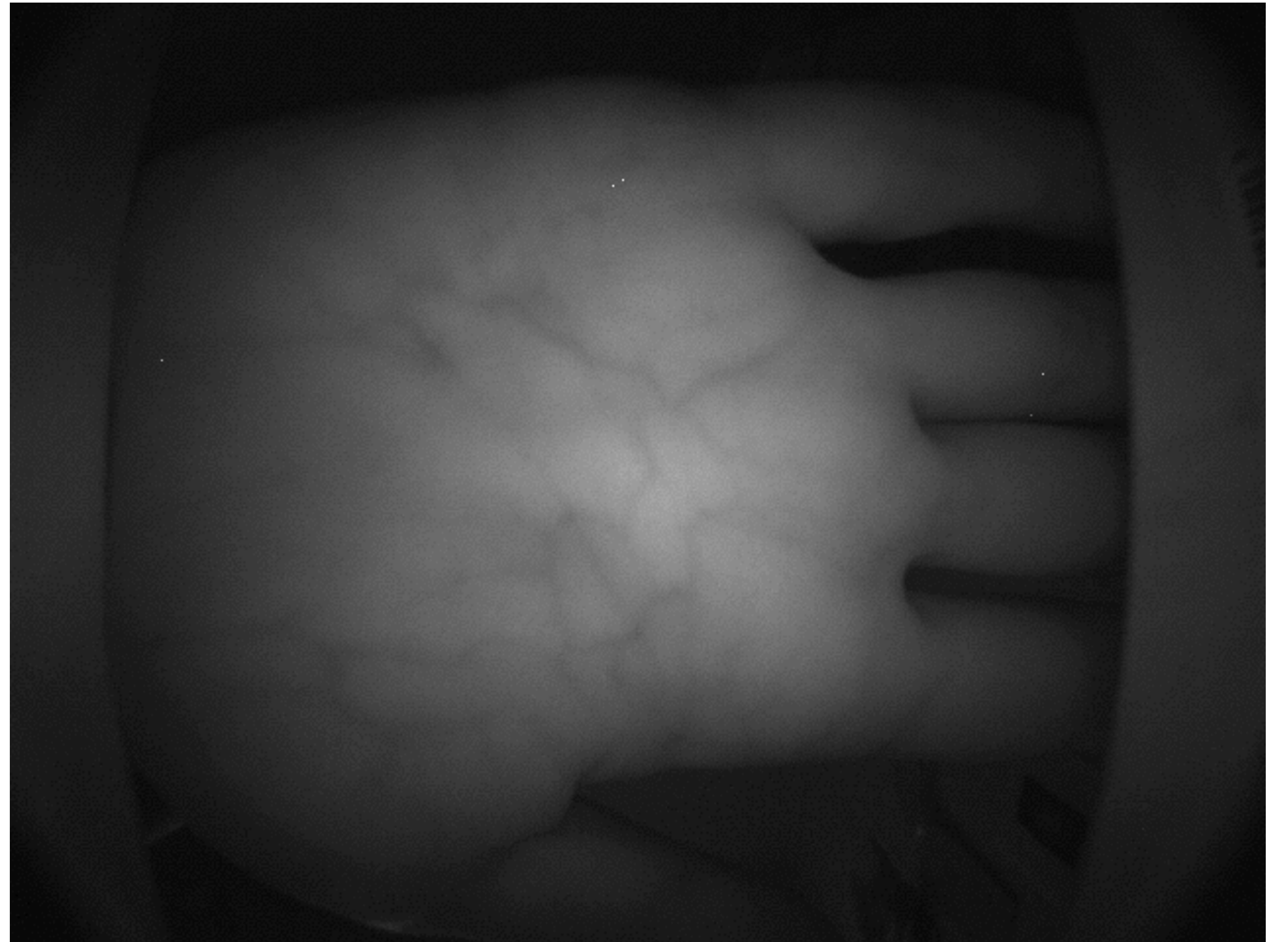
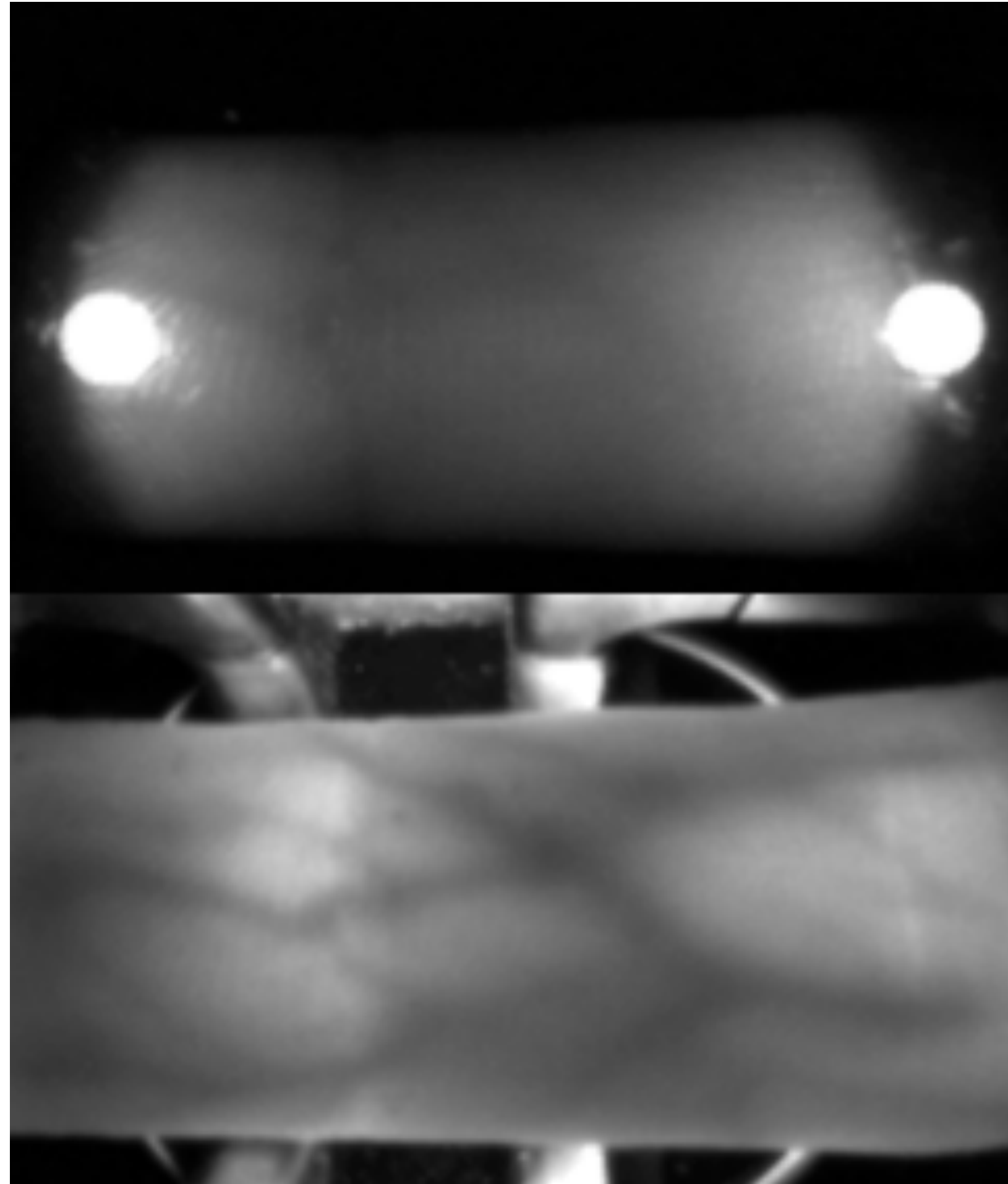


Biometrische Systeme hacken

- **Merkmale beschaffen**
 - Kommunikation Sniffen
 - Aus den Templatedaten generieren
 - Ein Foto machen
- **Attrappe basteln**
 - Passendes Material finden
 - Merkmal Kopieren



Merkmalsbeschaffung :: Sniff



Merkmalsbeschaffung :: DLSR



https://images-na.ssl-images-amazon.com/images/I/81KvgTUdSOL._SL1500_.jpg



Parameter

- Kamerratyp (Graustufen, Auflösung)
- Objektiv (Zoom, Beschichtung)
- Kameraeinstellungen (Apertur, Belichtungszeit)
- Optische Filter
- Lichtquelle (Wellenlänge, Intensität, Position)



<http://keywordsuggest.org/gallery/409649.html>

<https://swiss-sale.ch/media/image/product/2330/md/fenix-tk25-ir-led-taschenlampe-infrarotstrahler.jpg>

DLSR :: Bilder



Merkmalsbeschaffung :: sneaky

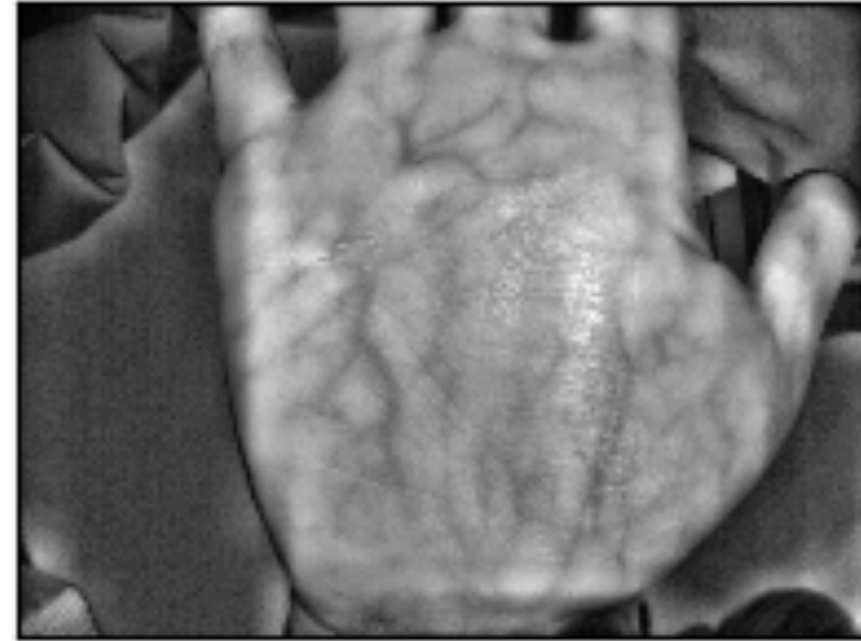


Raspberrykamera :: Bilder



preprocessing

Original Image with CLAHE



adaptiveThreshold 11,3



Median Noise Reduction



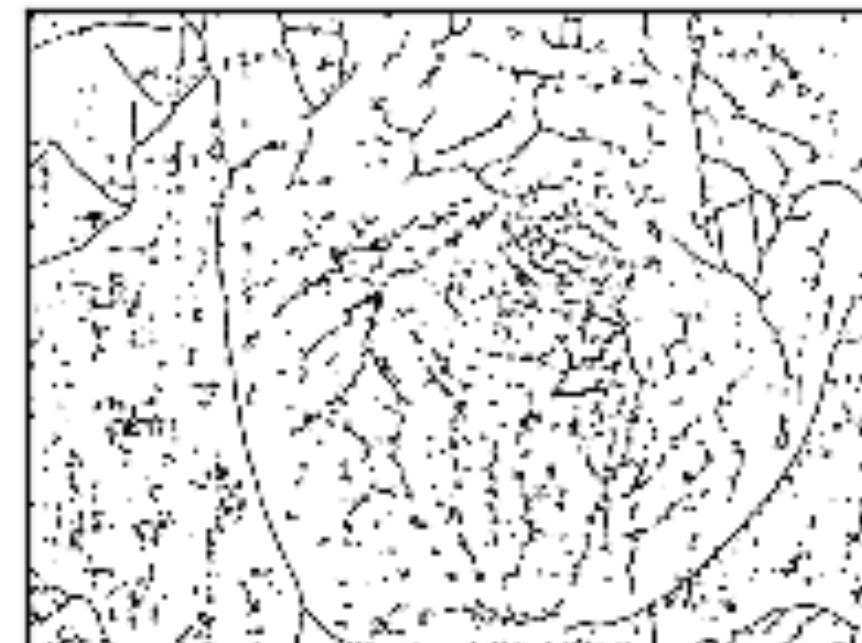
Gaussian Blur 3,3 (Output Image)



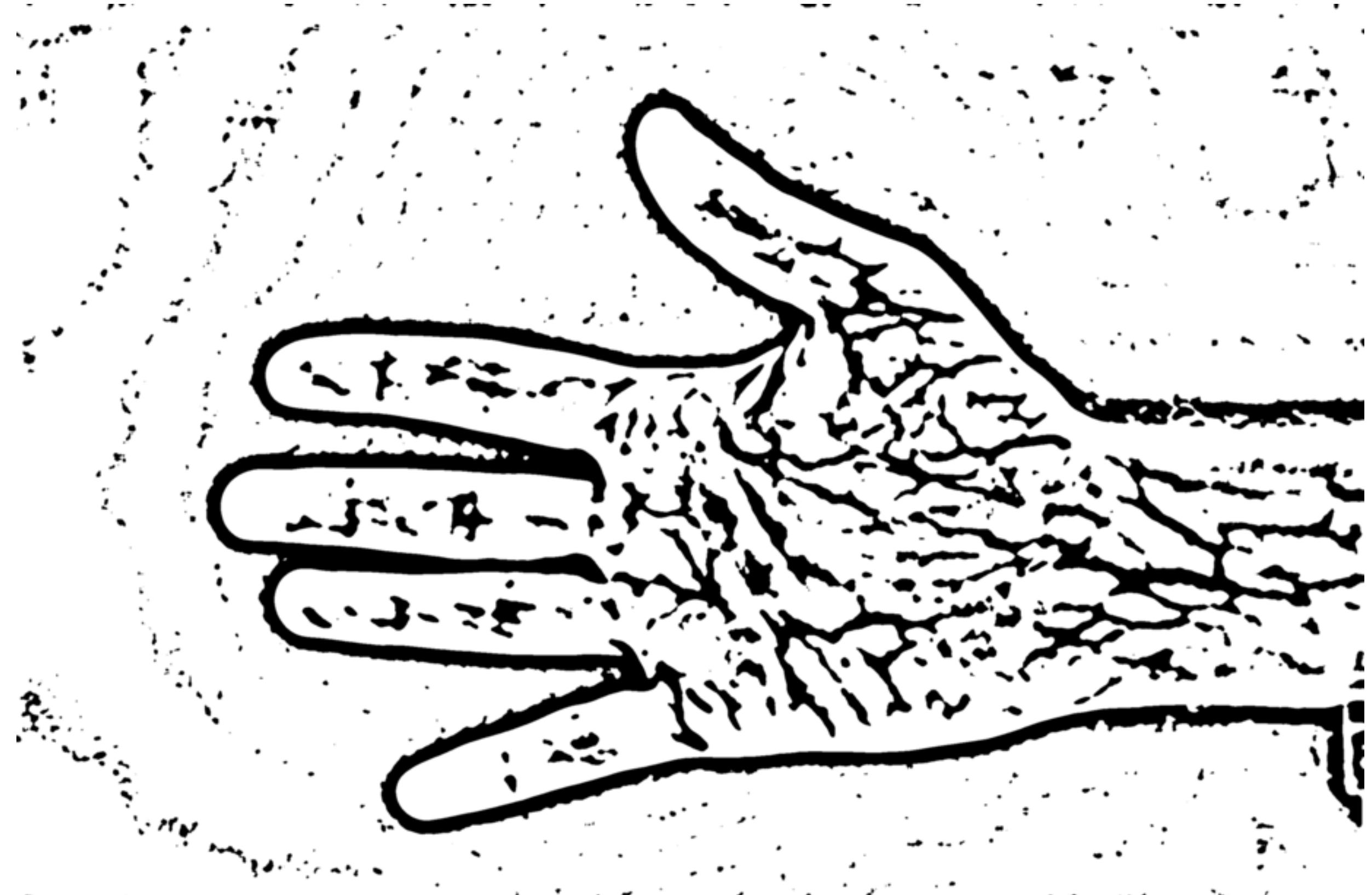
blur_result



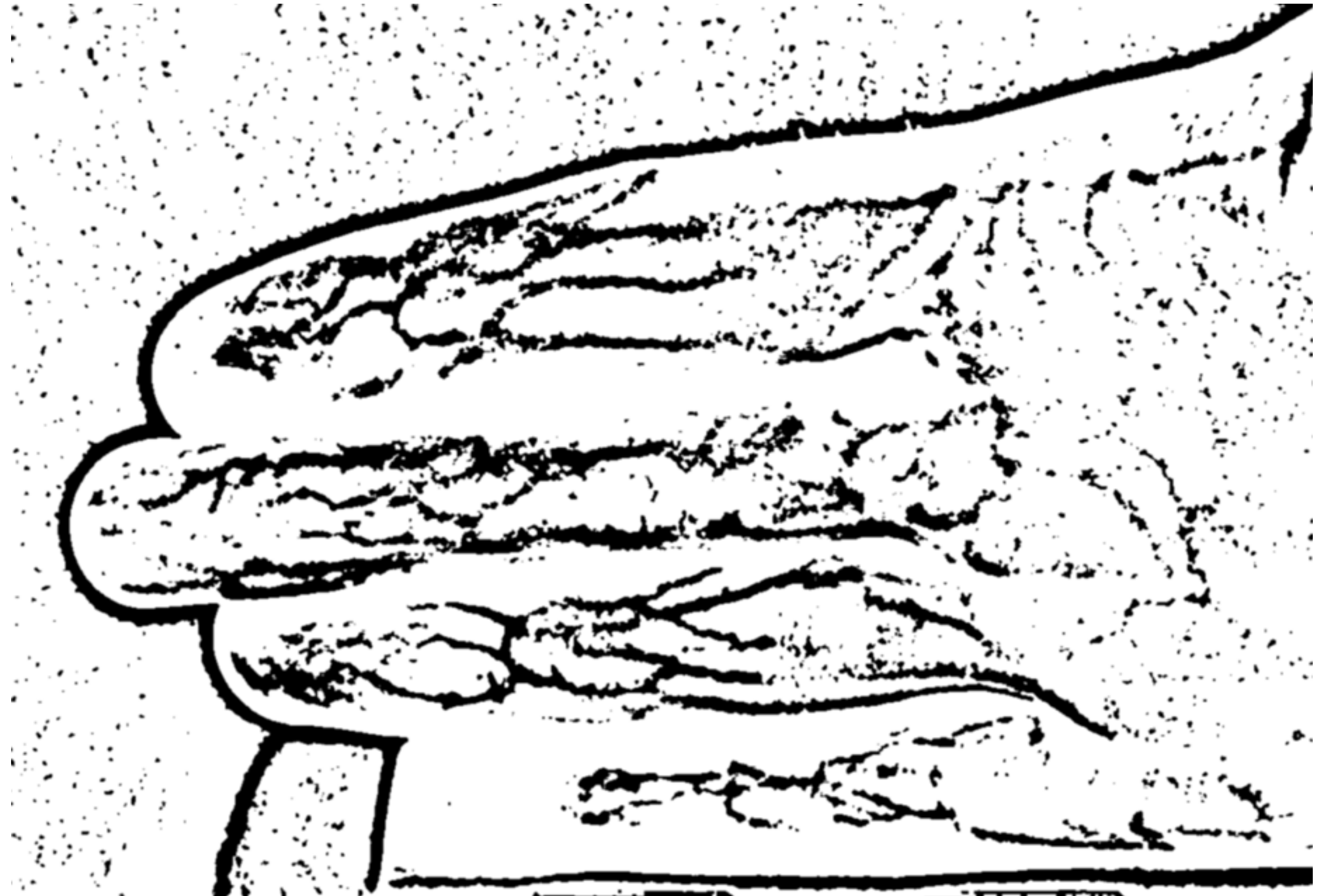
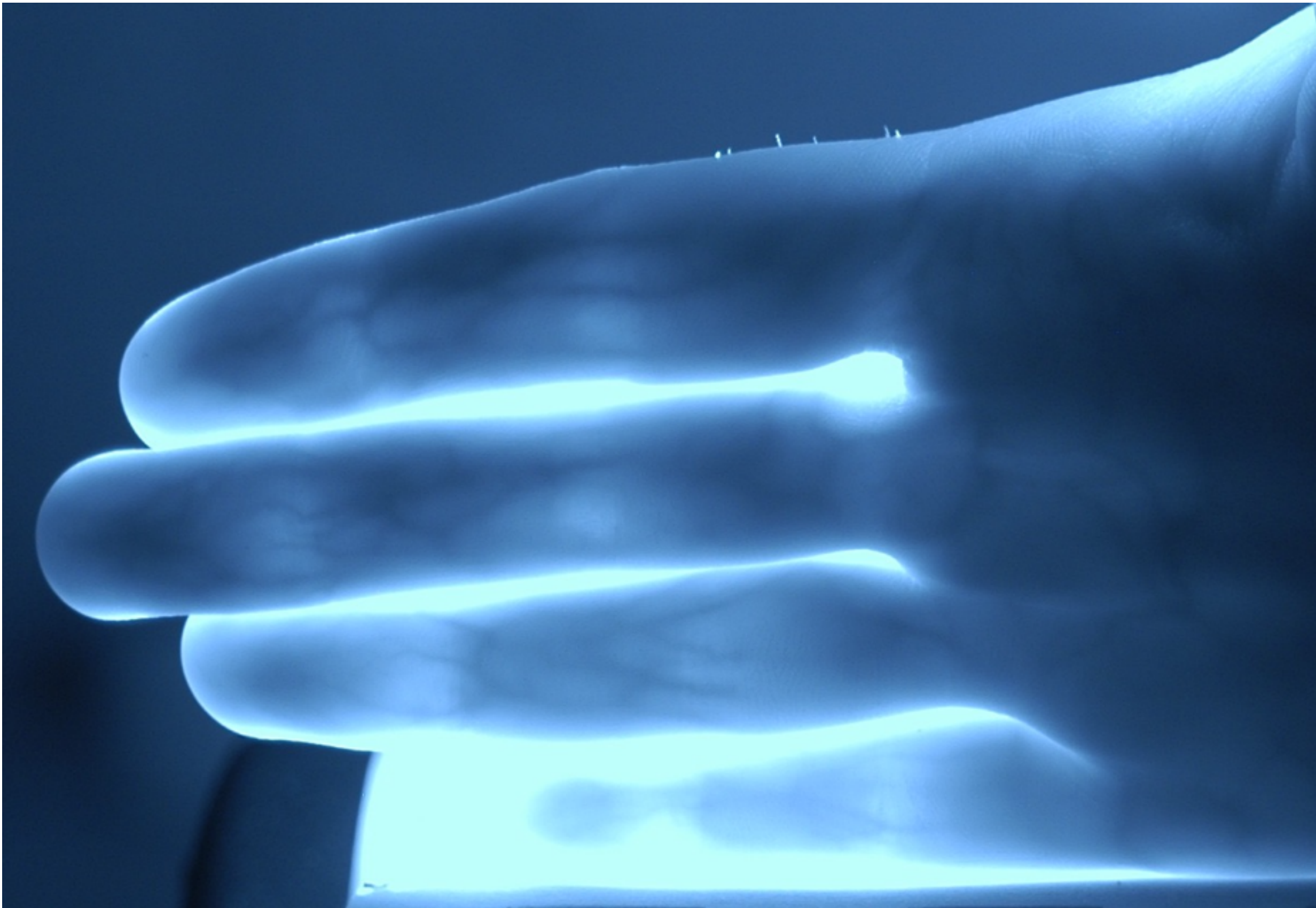
skeleton_result



Ergebnis :: Hand



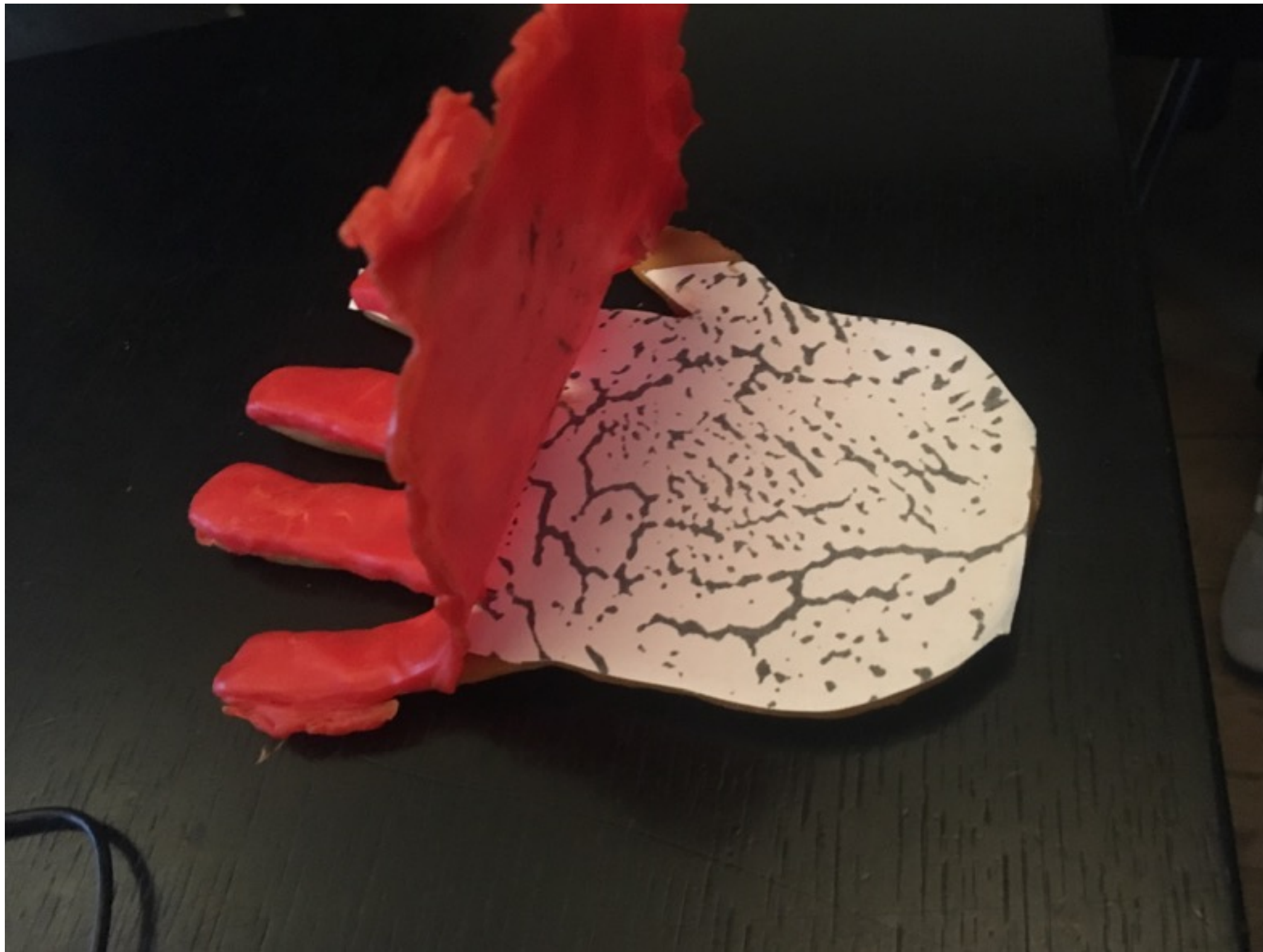
Ergebnis :: Finger



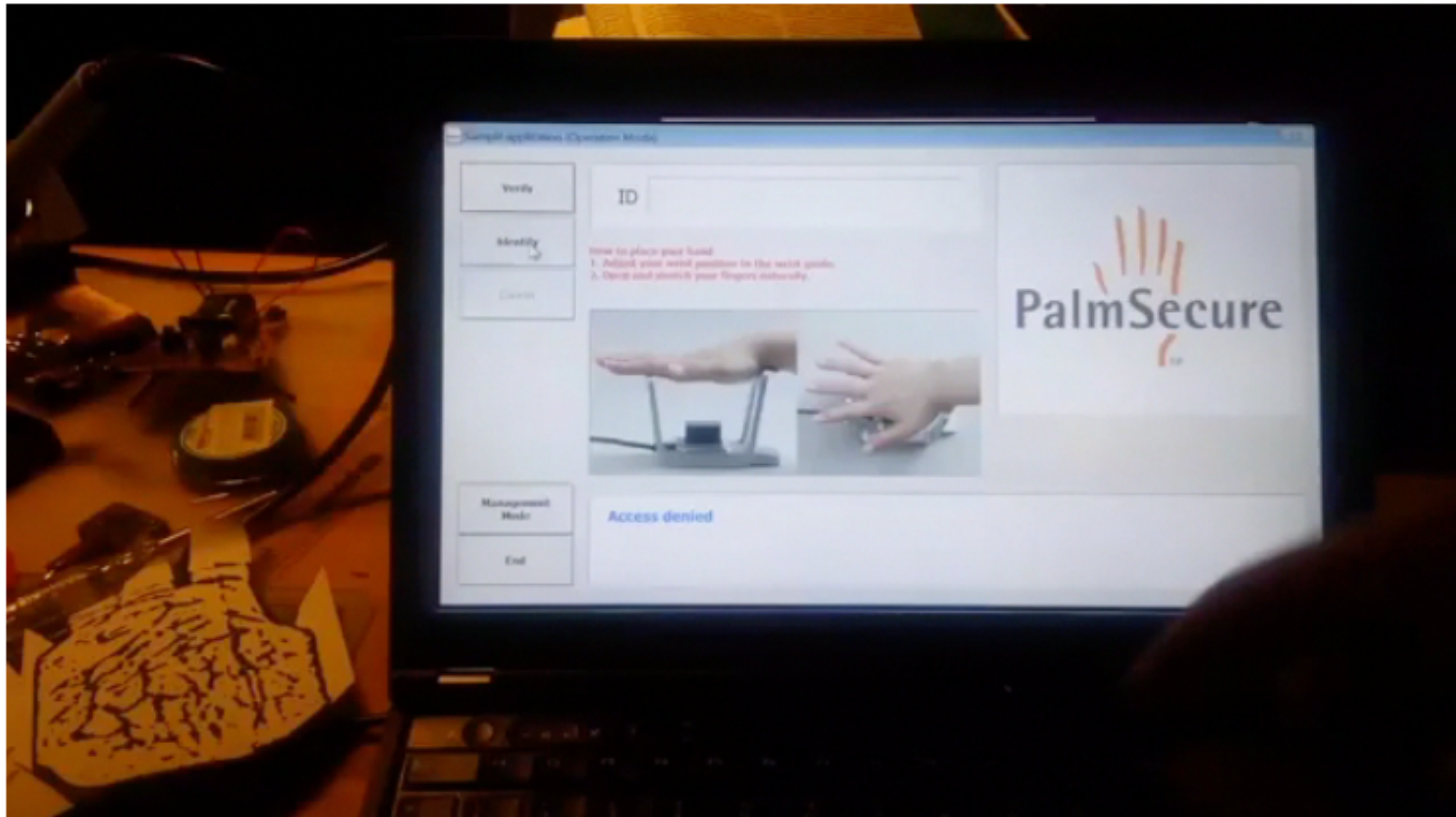
Attrappe :: Hand

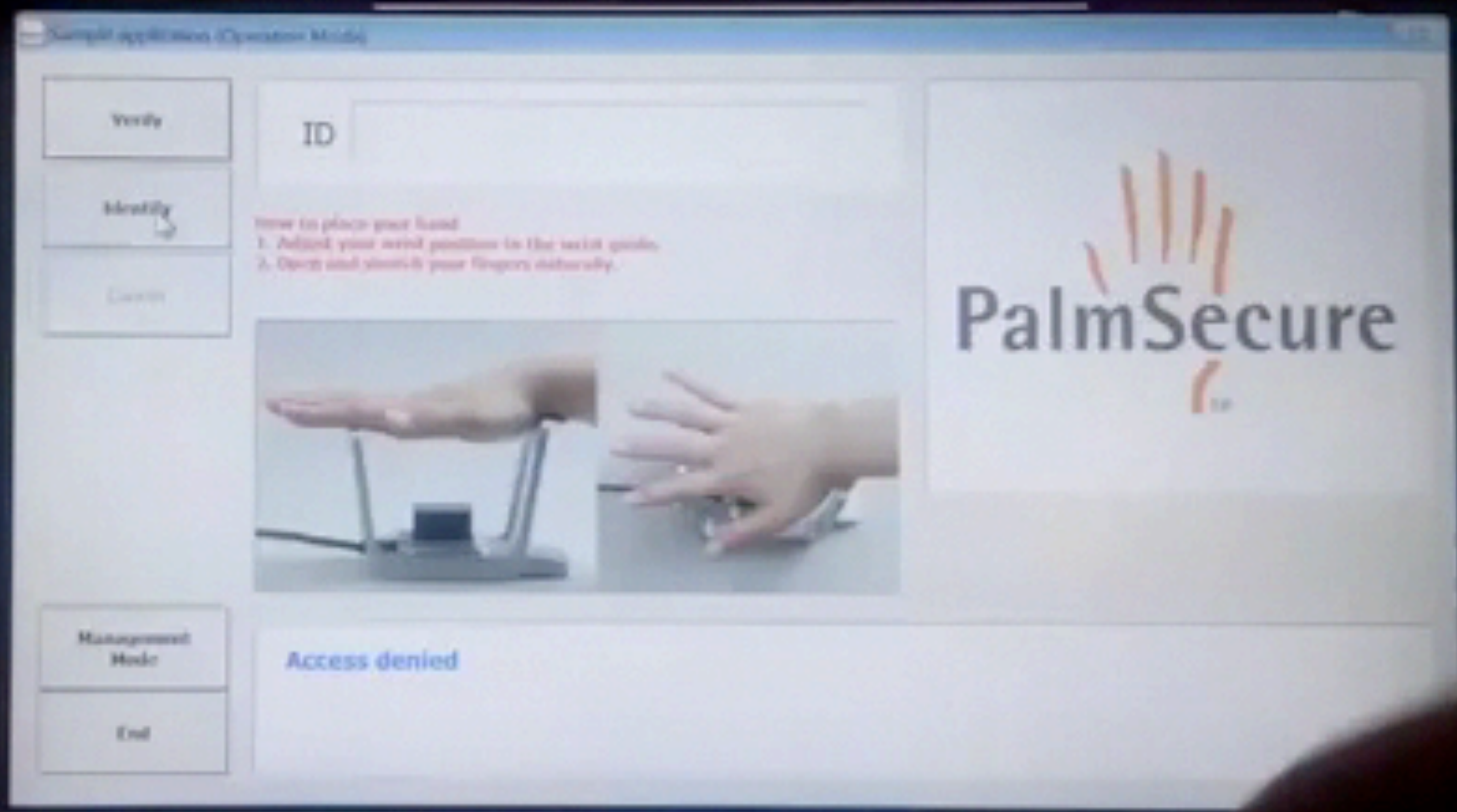


Attrappe :: Hand



live demo





Attrappe :: Finger

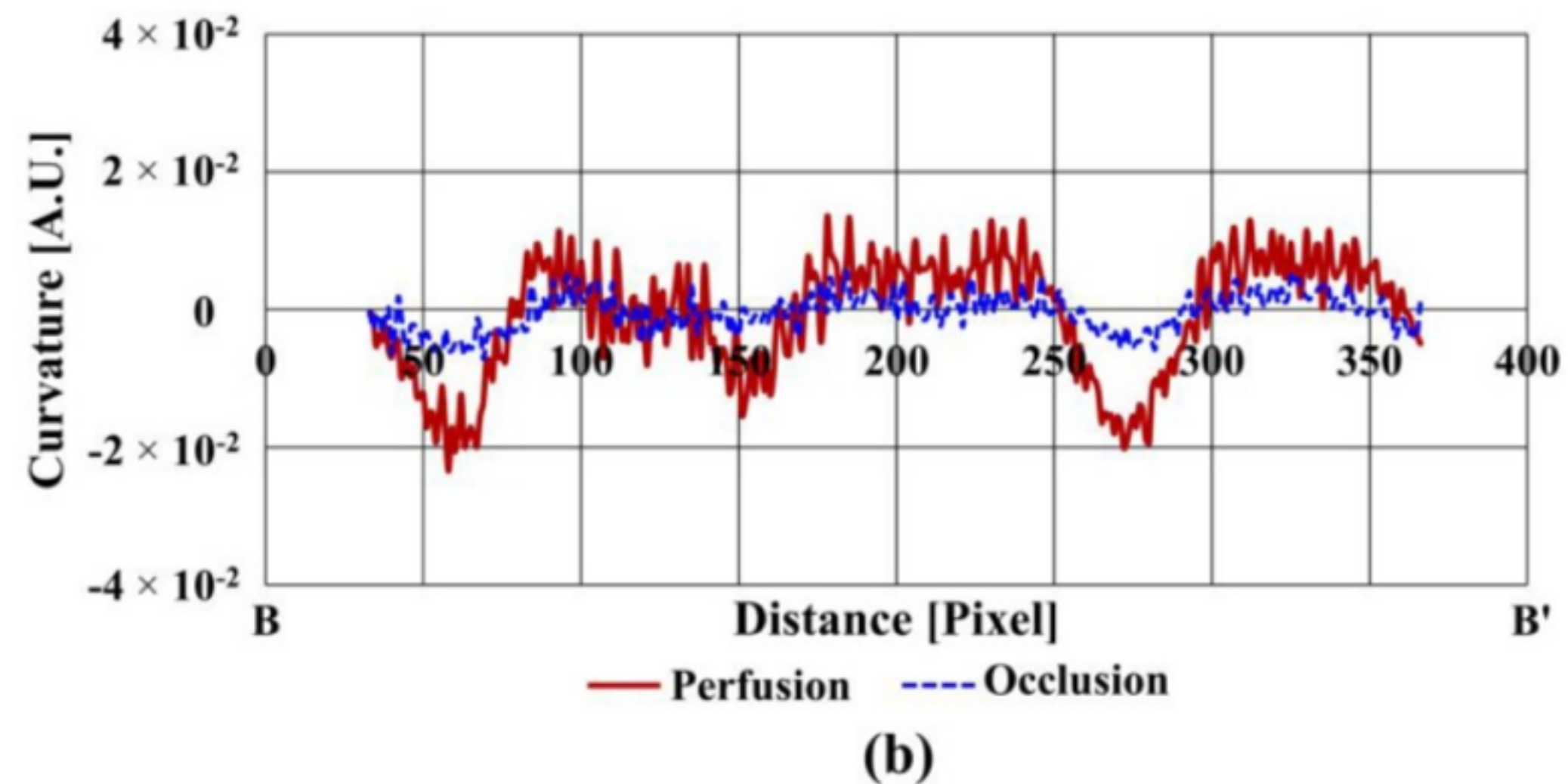
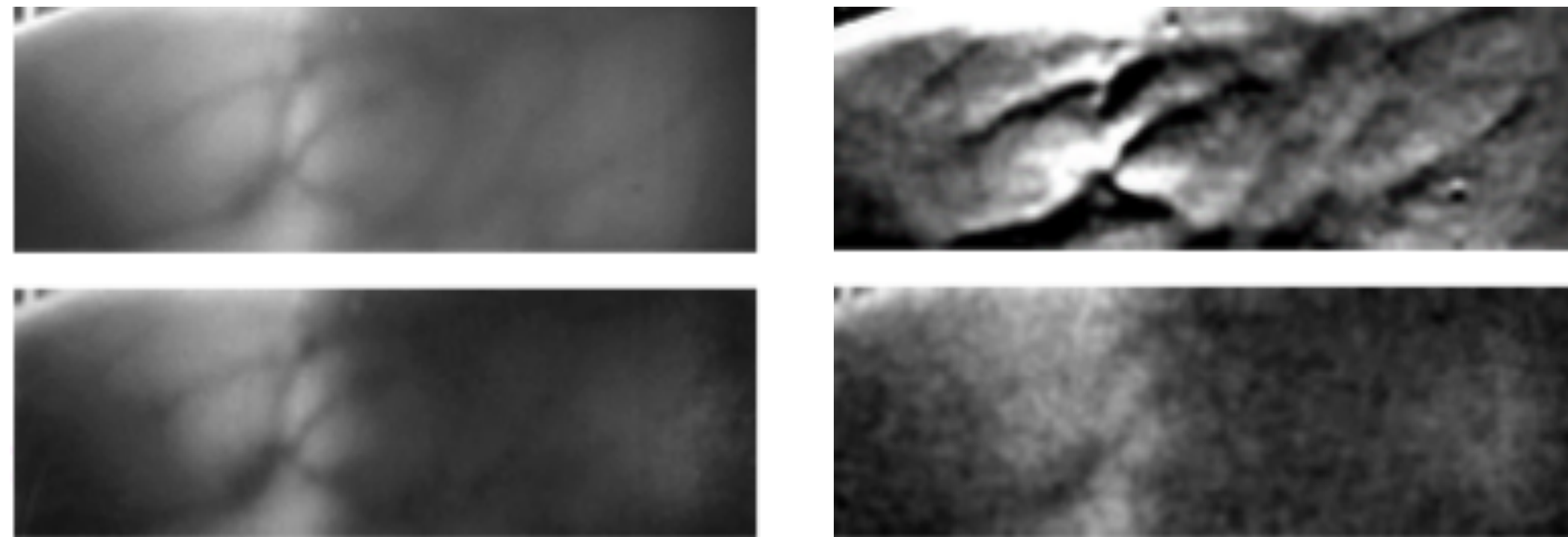


live demo



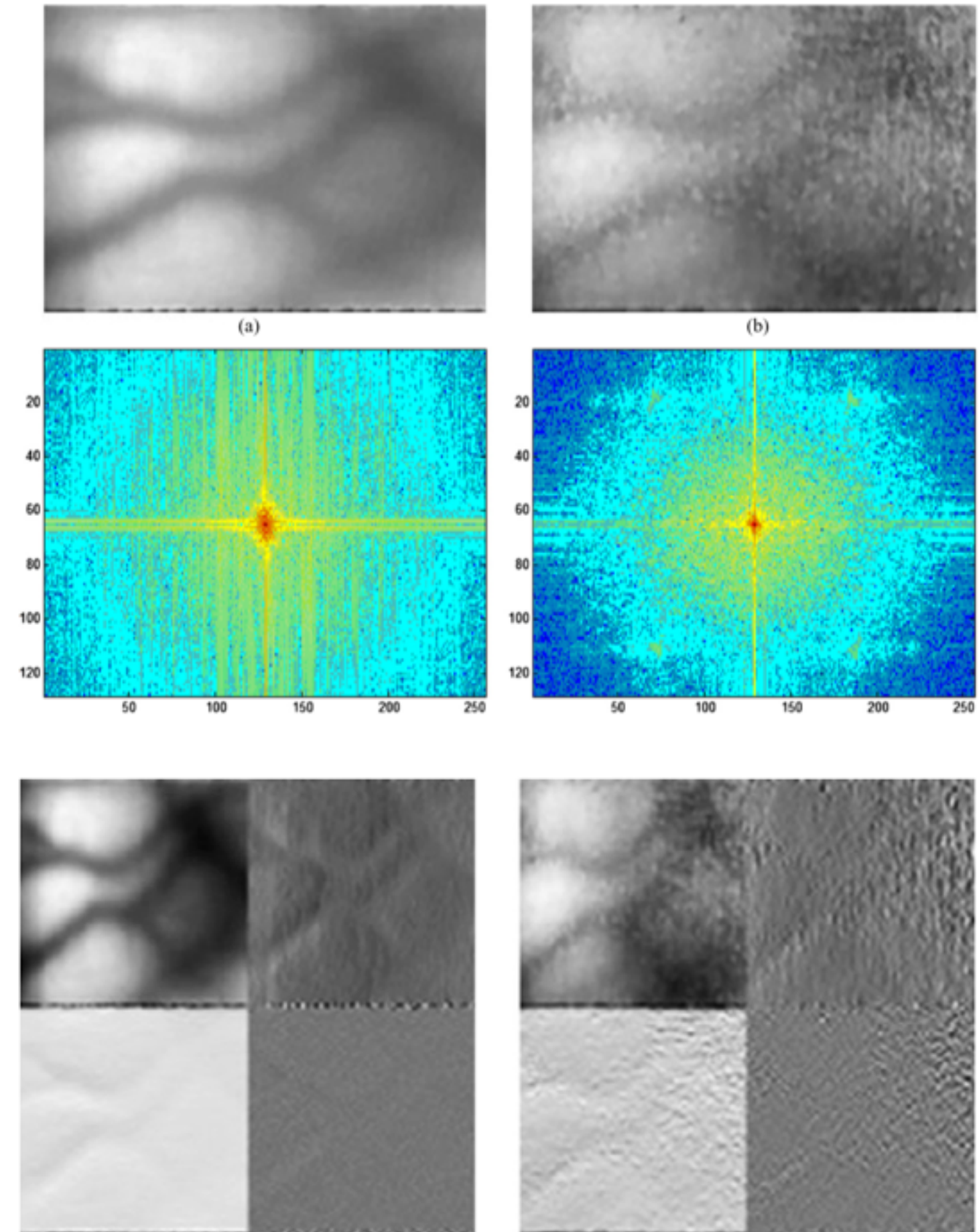


Lebenderkennung



RAGHAVENDRA, Ramachandra, et al.
Finger vein liveness detection using
motion magnification.

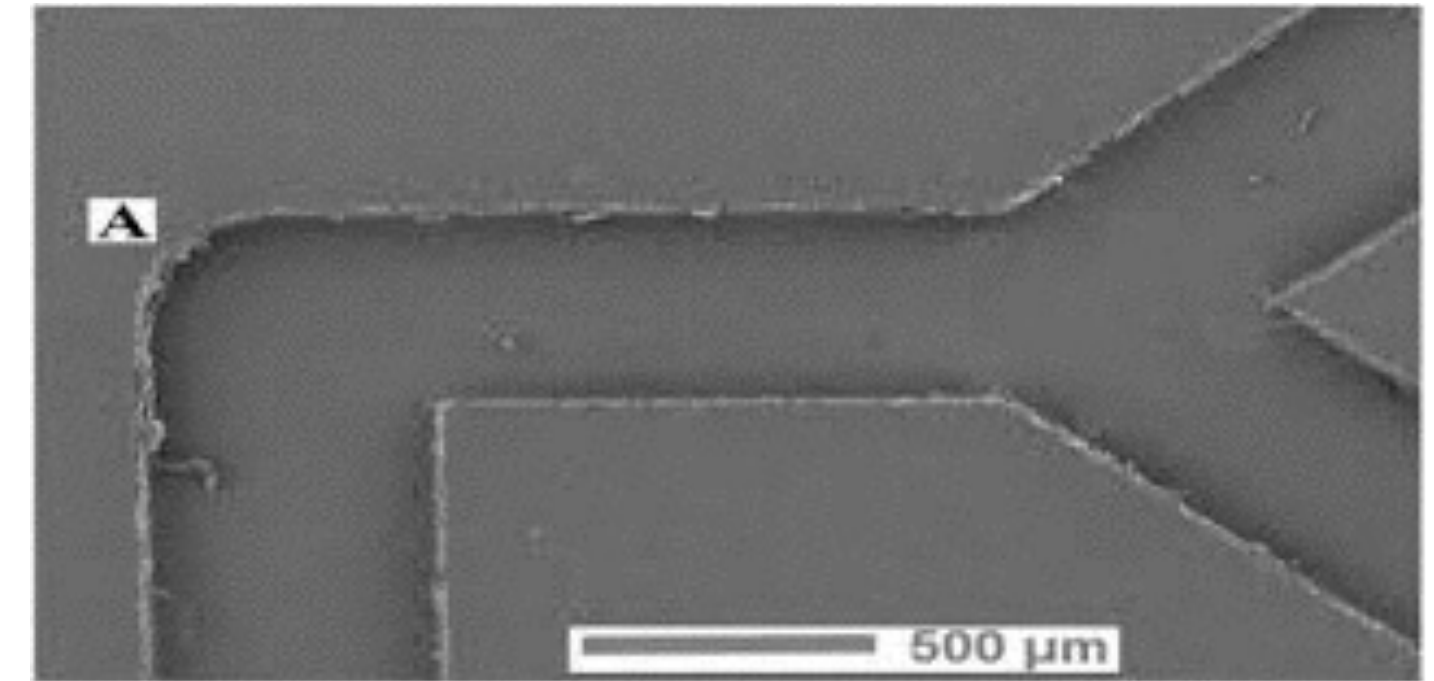
LEE, Jaekwon, et al. Imaging of the finger
vein and blood flow for anti-spoofing
authentication using a laser and a MEMS scanner



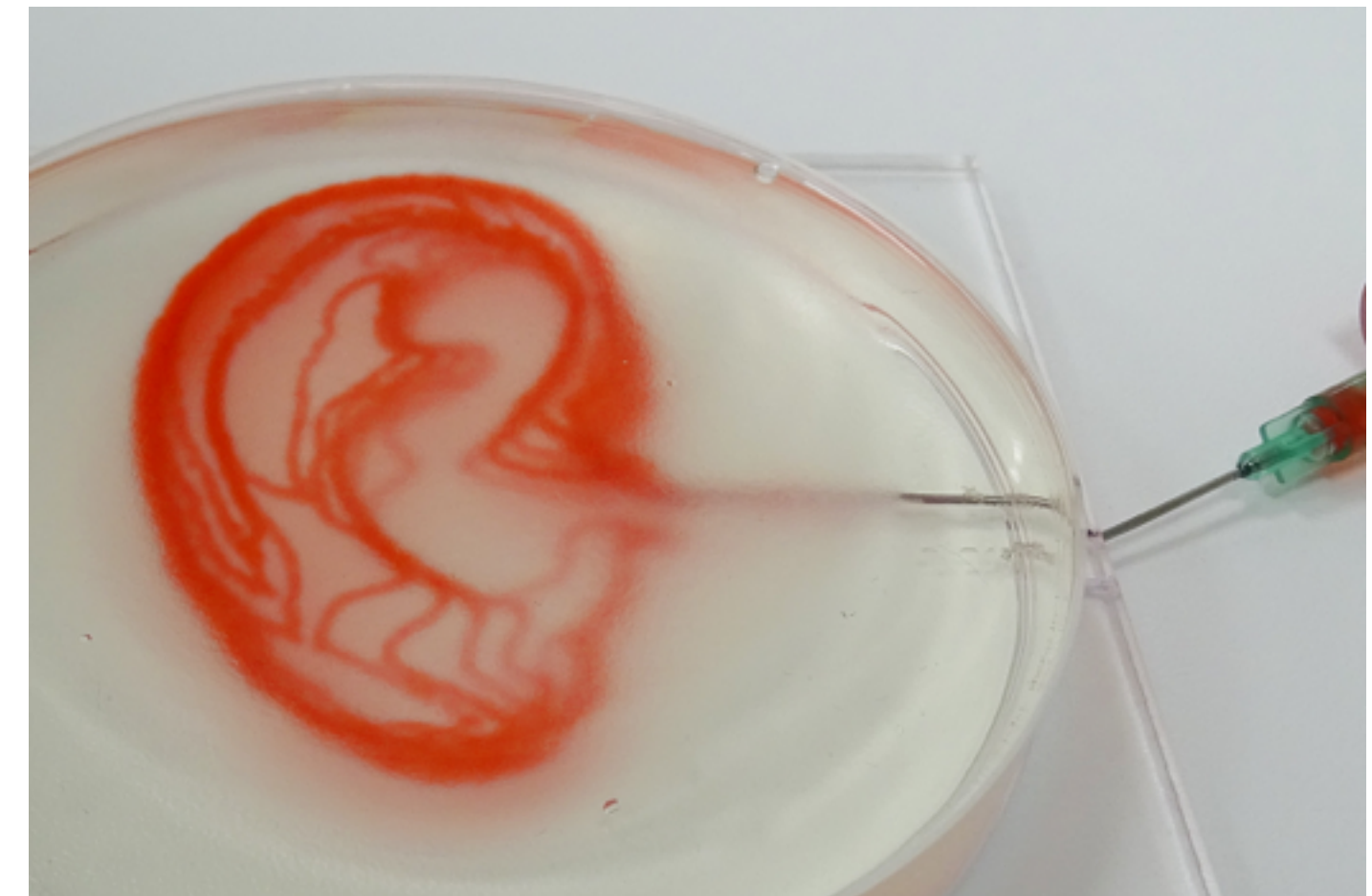
NGUYEN, Dat Tien, et al. Fake finger-vein image detection based
on fourier and wavelet transforms

künstliche Blutgefäße

- Mechanisch
 - Fräsen
 - Laser
 - 3D-Druck
- Drucken von Blutgefäßen



editorial.3dprint.com/wp-content/uploads/2017/12/Earlobe-vasculature.png



<https://3dprint.com/196651/3d-bioprinting-vitaprint-platform/>



Danksagung:
..., derpeter,
Maik, Felix, Jan, Ingo
Iurii

