

State vs Bracket and Dana
Case 22S019750

FOOTPRINT EVIDENCE

REPORT BY

Michael S. Nirenberg, D.P.M., B.Sc., B.A.

July 25, 2023

For

Sergeant Micah Perkins
Major Crimes Unit
Maine State Police

P1798

EXPERT'S NAME: Michael S. Nirenberg, DPM

RELEVANT QUALIFICATIONS:

I am a forensic podiatrist¹ and podiatric physician who has been in private clinical practice for more than 30 years. I am president of the American Society of Forensic Podiatry, served on the Forensic Podiatry Subcommittee of the International Association for Identification (IAI), and currently serve on the IAI's General Forensics Science and Practice Subcommittee. I also serve on the editorial boards of Science & Justice (journal of the Chartered Society of Forensic Sciences) and the Journal of the American Podiatric Medical Association (forensic podiatry and nerve surgery), and I am Chair of the Exploratory Task Group on Gait Analysis within the Organization of Scientific Area Committees (OSAC) for Forensic Science. I have also served as an invited peer reviewer for forensic and medical journals, including the Journal of Forensic Science and Medicine, Forensic Science International, and The Lancet -- one of the highest ranked medical journals. I was the first podiatric medical student to have a paper accepted for publication as a student (without a physician co-author) by the Journal of the American Podiatric Medical Association, whose editor made a special exception to publish my paper. I have been awarded the Distinguished Podiatric Medical Writing Award for my paper, "Forensic Methods and the Podiatric Physician".

I have also lectured on forensics extensively, including providing presentations at the IAI and the American Academy of Forensic Sciences. Beyond the USA, I have provided forensic and/or medical related presentations for persons in Canada, India, Israel and Spain, and have lectured to professional trackers, police, attorneys, and assisted in the training of podiatric residents. I have also assisted law enforcement in

¹ see appendix 1 for additional information on forensic podiatry

the USA and Canada in the analysis of foot and gait-related evidence in criminal matters and provided review/verification of forensic reports for criminal cases in the United Kingdom (UK). In the undertaking to determine if persons may have been wrongfully convicted, I have examined gait/pedal evidence for agencies in Commonwealth of Massachusetts, New York, California and Iowa. In 2022, my assistance contributed to the exoneration of a wrongfully convicted person. I have authored or co-authored more than 45 medical or forensic publications (or accepted publications) and/or short communications. Specific to this case, I have authored studies examining footprints in the forensic context.

I am a co-editor of the textbook "Forensic Gait Analysis: Principles and Practice," published by Taylor & Francis CRC Press. In my capacity as an expert, I have also assisted the Department of Justice (DOJ) in Indiana in assessing allegations of podiatric malpractice in the Veteran's Administration and have assisted the DOJ in Illinois in a fraud investigation involving podiatry. I have also assisted in civil matters involving foot, ankle or gait related issues. I have testified at trial in Kentucky, Colorado, Wisconsin, the Commonwealths of Massachusetts, Indiana and Virginia. In addition to a degree in podiatric medicine, I hold a Bachelor of Art and Bachelor of Science degrees. Please see my CV (enclosed) for additional details.

REQUESTED TASK

Sergeant Perkins requested that I examine pedal information from Donell Dana and Kailie Bracket and to compare this information to footprints of an unknown origin found at the Thunder Road Apartments' crime scene with a view to determine whether either person could or could not be responsible for creating them.

MATERIALS PROVIDED

- Inked footprints (bare and sock-clad) made from Mr. Dana and Ms. Brackett while standing and walking
- Photographs of the footprints from Mr. Dana and Ms. Brackett
- Foot outlines of Mr. Dana and Ms. Brackett
- Photographs of footprints from the crime scene and crime scene photographs
- Video of law enforcement acquiring the footprints from Mr. Dana and Ms. Brackett
- Photographs of Mr. Dana and Ms. Brackett
- Video of an unknown person seen outdoors moving away from the camera

It is my understanding that the crime occurred in the summer of 2022 and the footprints and pedal information from Mr. Dana and Ms. Brackett was obtained in June 2023.² I was also told³ that the crime scene footprints were on linoleum and carpet and were processed with leuco crystal violet, and the socks worn by Mr. Dana and Ms. Brackett for creation of the footprints were new and provided by the prison.

EXAMINATION AND ANALYSIS OF PEDAL INFORMATION

Footprint examinations are usually conducted to determine whether an individual's foot or feet could have made the footprint(s) associated with a crime. Such examinations require the examination and comparison of the crime scene (questioned) footprints to a person's (reference) footprints and may involve podiatric consideration of the person's pedal findings and/or information (Vernon and DiMaggio, 2017).

² Additional photographs of Ms. Brackett's feet were provided in July 2023

³ By Sergeant Perkins

Research has shown footprints to be distinctive and exhibit individuality (Vernon and DiMaggio, 2017). A database has been collated in Canada led by Kennedy (Forensic Identification Research Services, Royal Canadian Mounted Police) footprints were proved to be different (Kennedy, 1996, 2002, 2005, 2005b, 2007). Kennedy et al.'s work concluded that their study found that "the odds of a chance match" in the general population for a footprint is one in 1.27 billion (Kennedy, 2005b). Other researchers have also shown footprints to be distinctive, such as Krishan (Krishan, 2007), Laskowski and Kyle (Laskowski, 1988), Barker and Scheuer (Barker and Scheuer, 1998), Qamra et al. (Qamra, 1980) and Moorthy et al (Moorthy, 2015). Footprints have not been proven to be unique and while in theory the foot of two persons may make the same footprint, I am not aware of a circumstance or research of this occurrence.

Of note, the well-regarded scientist C. Owen Lovejoy co-authored research establishing correspondence between bare and sock-clad footprints, and also demonstrated that a footprint of only the forefoot yields individuality (Smerecki and Lovejoy, 1984). This research contributed to the admissibility of the authors' testimony in a case involving a sock-clad forefoot footprint. Other researchers have recognized the forensic value of sock-clad footprints (Kennedy and Yamashita, 2007; Vernon and DiMaggio, 2017; Nirenberg, 2019).

Variation in footprints between persons is the result of the variation in human feet. Notably, research by Jurca et al. [Jurca et al., 2019] analyzed 1.2 million 3D foot scans collected across North America, Europe, and Asia. The authors found the existence of many statistically significant differences in foot measurements amongst the regions and between genders, stating, in part, that their research "demonstrated large dispersion of all studied foot dimensions..." Research by Kouchi (Kouchi, 1995) considered foot morphology and found "... great inter-individual variation in [the foot's] three-dimensional skeletal structure..."

The individuality and distinctiveness of the human foot is the result of the complexity of the foot's anatomy and biomechanics. This is influenced by a myriad of hereditary and environmental factors. These factors include the possibility for further variation due to disease affecting the foot (Tang et al., 2017; Reina-Bueno et al., 2021; Milliken et al., 2014, Meines et al., 2012); or secondary to other structural-related issues (Van Gheluwe et al., 2005; Levinger et al., 2010; Cichy et al., 2006), injuries, the development of pathologic deformities (Hung et al., 1985, Sayli et al., 2018, Kusumoto et al., 1996) or dermatological abnormalities (Dockery and Crawford, 1999). In brief, the anatomical structure of the human foot is comprised of 26 bones, 19 intrinsic muscles, 10 extrinsic muscles, and many ligaments (Kelikian and Sarrafian, 2011). These structures (and foot's other related structures) contribute in varying degrees to the complex function of the foot during standing and walking, and influence the formation of the foot's highly variable morphology. Other factors also influence the foot's individuality, such as gender (Atamturk et al., 2010; Krauss et al., 2008; Wunderlich and Cavanagh, 2001), age (Tomassoni et al., 2014; Mickle et al., 2010; Scott et al., 2007), body weight (Price and Nester, 2016), footwear use (Hollander et al., 2017; D'Aout et al., 2009), and ethnicity (Hawes et al., 1994; Dunn et al., 2004, Kouchi, 1998).

The initial stage of the requested-task was to assess if the materials provided are suitable for forensic examination and analysis in the context of the case. Should the materials be adequate, examination and analysis of the pedal materials involves the use of overlays, measurements and visual assessment. Image analysis on the computer in this case utilized a Digital Storm Slade Studio Workstation with Intel Core i9-10980XE Extreme Edition (18-Core), 32GB DDR4 3600MHz HyperX Fury RGB, NVIDIA RTX A2000 6GB with a GIGABYTE M28U 28" 144Hz monitor. Photoshop (version cc) was used. Image examination, at times, involved adjustments to improve visualization. The video was played on VLC media player (version 3.0.18).

The task involved choosing questioned and reference footprints that displayed adequate visible features for meaningful analysis. From the questioned footprints, four different footprints were chosen for meaningful analysis. These were provided with the following notations: FP 1, FP 2, FP 3 and FP 4. Since the questioned footprints appear to be made from a sock-clad foot, the focus of the comparison was with sock-clad reference footprints. Among, the reference footprints, K-SF-A Standing (CAL_1900), K-SF-A 6 Walking (CAL_1906.NEF), K-SF-B Standing (CAL_1886.NEF), K-SF-A 4 Walking (CAL_1904.NEF), D-SF-A Standing (CAL_1786.NEF), and D-SF-A-9 Walking (CAL_1794.NEF) were chosen. The left footprint at the crime scene was determined to not be adequate for meaningful analysis.

The comparison of the features of footprints is grounded in standard, established principles of forensic physical comparison science (Vernon and DiMaggio, 2017; Vanderkolk, 2009). Features of footprints are usually class level features, occurring in varying proportions of the population. However, the particular combination of features exhibited by a footprint can add to their discriminatory potential (Vernon and DiMaggio, 2017). In an FBI study of 500 footprints, only five or fewer of the most general characteristics were necessary to either identify or discriminate a footprint from all others in the study (Bodziak, 1999). Features of footprints recur, but their presence or appearance in a given footprint may be affected by factors such the person's particular activity during the formation of the footprint, such as whether they are walking, standing still or turning; or by such factors as the distribution and/or amount of the substrate on their foot or the surface characteristics.

Comparisons made between the questioned footprints and the reference footprints⁴ are considered in following way:

- compatible features
features seen to be exhibited in both the questioned footprints and reference footprints
- incompatible features
features seen to be exhibited in either the questioned footprints or the reference footprints, which would preclude the footprints from being made by the same person
- features that differed but are not incompatible⁵
features seen to be exhibited in the questioned footprints, but not in the reference footprints
features seen to be exhibited in the reference footprints, but not in the questioned footprints

In terms of linear measurement comparison of bare footprints, Kennedy found an error margin of 5mm was appropriate (Kennedy, 2007) and an FBI study used a size bracket of 5mm to “account for any variations” in the impression process (Bodziak, 1999). This error margin (5mm) has been recognized as reasonable in forensic investigations (Vernon et al., 2020).

The probative value of the features of the footprints, the combinations of features in the footprints, and the comparison of the questioned and reference footprints⁴ is assessed. The recognition of features and combinations of features in the footprints is based on knowledge, experience and understanding.

Similarly, the assessment of their probative value is an expert, subjective process.⁶

⁴ including consideration to associated pedal information, such as information conveyed in photos of the foot, when applicable

⁵While such a feature is seen to differ between the questioned footprints and the reference footprints, the difference is not such as to preclude the questioned footprint from being made by the person who made the reference footprints, and may be attributable to other factors.

⁶ relevant external data may be assistive

Person 1: Kallie Brackett

Summary of features in the questioned and reference footprints⁴

The results of linear measurement comparison of the ball width are below in centimeters.

Footprint	Reference K-SF-B Standing	Reference K-SF-A-4 Walking	Reference K-SF-A Standing	Reference K-SF-A-6 Walking	Questioned Right Footprint FP1	Questioned Right Footprint FP2	Questioned Right Footprint FP3	Questioned Right Footprint FP4
Ball width	8.31	8.40	8.43	8.38	8.14	Cannot be determined	Cannot be determined	Cannot be determined

The questioned and reference footprints exhibit:

- Similar relative toe lengths
- Similar positioning (straight) of both first toes, second toes, third toes, fourth toes and fifth toes⁷
- Similar shape of the tip of both first toes, second toes, third toes, and fourth toes
- Similar angulation of the tip of both first toes, second toes, third toes, fourth toes and fifth toes
- Similar general shape of the pad of both first toes, fourth toes and fifth toes
- Similar general shape (circular) of the pad of both third toes⁸
- Similar general shape (oval, in the proximal-distal⁹ direction) of the pad of both second toes¹⁰
- Similar shape of the medial¹¹ edge of both first toes, second toes, and fourth toes
- Similar shape of the lateral¹² edge of both first toes, second toes, and fourth toes
- Similar shape of the lateral edges of both third toes and fifth toes
- Similar base edge shape of both first toes, second toes and third toes

⁷ toes are numbered from the great toe or big toe to the little toe or baby toe (e.g. big toe is number 1, little toe is number 5)

⁸ exhibited in two reference footprints; other two reference footprints exhibit an oval shape

⁹ proximal means nearer to the point of attachment to the body (e.g. the attachment of a toe to the foot) and distal refers to a part of the body that is farther away the body or another part (e.g. the far end of a toe)

¹⁰ exhibited in one reference footprint, other two reference footprints exhibit a circular shape

¹¹ the medial side of a toe or the foot may be thought of as the inside

¹² the lateral side of a toe or the foot may be thought of as the outside

- A single tip impression in both second toes, third toes, fourth toes and fifth toes
- The presence of toe stem in both first toes and both second toes
- A continuous toe stem in both first toes
- A discontinuous toe stem in both second toes
- Ghosting at both first toes and both fifth toes
- A diagonal overall relative shape of both footprints' balls (medial to lateral, distal to proximal)
- A similar shape of both balls' medial edge
- A similar shape of both balls' lateral edge
- A similar shape of the both balls' distal (anterior) edge
- A similar general appearance of both arches
- A similar shape of the both arches' lateral edge

Of particular interest is the reference footprint impression of the fifth toe area. This impression could be the result of Ms. Brackett's fifth toe, which has a varus rotation deformity. Normally the pad of human toes contacts the ground but, in Ms. Brackett's case the lateral side of her fifth toe does.¹³

Overall, the questioned and reference footprints are of similar size and morphology. No incompatible features between the questioned and reference footprints⁴ were observed that could exclude Ms. Brackett as the maker of the crime scene footprints.

¹³ This may be appreciated by comparing the footprint labelled FP 1, with K-SF-A Standing, K-SF-B Standing and K-SA-4 Walking footprints, and the photographs of Ms Brackett's foot (CAL_1880 and CAL_1883)

Person #2: Donell Dana

Summary of features in the questioned and reference footprints⁴

The measurement comparison of the ball width is below in centimeters.

Footprint	Reference D-SF-A Standing	Reference D-SF-A-9 Walking	Questioned Right Footprint FP1	Questioned Right Footprint FP2	Questioned Right Footprint FP3	Questioned Right Footprint FP4
Ball width	10.84 cm	11.36 cm	8.14 cm	Cannot be determined	Cannot be determined	Cannot be determined

The comparison process found the reference and questioned footprints were not compatible in size (all suitable footprints were examined in this regard).

Differences in features between the reference footprints and questioned footprints were also exhibited.

The question and reference footprints exhibit:

- A general shape of the pad of the second toe of the questioned footprints is oval (in the proximal-distal⁹ direction) and in the reference footprints the general shape of the pad of the second toe is circular
- The absence of ghosting at the third toe of the questioned footprints but the presence of ghosting at the third toe of the reference footprints
- A single tip impression at the fourth toe of the questioned footprints and a double tip impression of the fourth toe of the reference footprint
- A straight lateral edge of the fifth toe in the reference footprints and a convex-shaped lateral edge of the fifth toe in the questioned footprints
- A straight lateral edge of the arch in the questioned footprints and a slightly convex lateral edge to the arch in the reference footprints

Of note, is the questioned footprints impression of the fifth toe area. This impression differs from the reference footprints and it would not be the result of Mr. Dana's fifth toe, whose pad appears to contact the ground in a typical manner.

Overall, the questioned and reference footprints are of different size, and they also exhibit morphologic differences.

EVALUATION AND CONCLUSIONS

Conclusions made from the prior information are made within the context of the following limitations:

- Limited clarity of some aspects of the footprints
- Absence of some aspects of the footprints
- Substrate variation
- Surface variation
- *Likely sock variation*
- Effects of wearing a sock
- Possible gait variation
- Number of questioned and reference footprints examined
- Possible changes in the foot of the persons making the reference footprints during the intervening time from the date of the crime to the date the reference footprints were made

When evaluating the comparison of the features of footprints⁴ observed, and in drawing conclusions from that examination and analysis, two opposing propositions were considered:

- i. that the questioned footprints were made by the person who made the reference footprints
- ii. that the questioned footprints were not made by the person who made the reference footprints

Based on my knowledge of the human foot and footprints, in view of the combinations of features of the footprints, and taking into account the associated pedal information and the limitations listed herein, I have reached the following opinions and following levels of evidentiary support:¹⁴

1. There is a moderately strong level of evidence to support the proposition that Mr. Dana did not make the questioned footprints.
2. There is a moderate level of evidence to support the proposition that Ms. Brackett made the questioned footprints.¹⁵

This is an opinion-based conclusion and is not predicated on numerical data or statistical calculation. I have based my approach to examination of the items in this case, my interpretation of the findings and my conclusions, on the materials provided to me. My review of new materials or new information may result in a change in my opinions and I reserve this right.

¹⁴ See Appendix 3 for an explanation of verbal expressions of the degree of support.

¹⁵ As footprints have not been proven to be unique, it is theoretically possible that a person (or persons) with a right foot with sufficient similarity to Ms. Brackett's right foot as to exhibit the same features and combination of features as Ms. Brackett's footprints could exist and could have made the questioned footprints

I confirm that the contents of this report (consisting of 23 pages, including appendices) are true to the best of my knowledge and my belief and that I make this report knowing that, if it is tendered in evidence, I would be liable to prosecution if I have wilfully stated anything which I know to be false or that I do not believe to be true.

Signed:

Michael S. Nirenberg

Michael Nirenberg, DPM

Verified by:

CM

Christine Miller, DPM, PhD, CWSP, FACCWS

Appendix 1: Forensic Podiatry

Definition

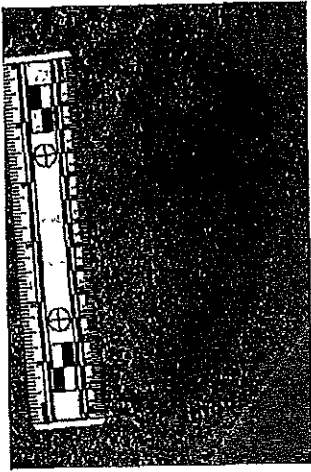
Forensic podiatry has been defined as “the application of sound and researched podiatry knowledge and experience in forensic investigations, to show the association of an individual with a scene of crime, or to answer any other legal question concerned with the foot or footwear that requires knowledge of the functioning foot.” (Vernon and McCourt, 1999)

Acceptance

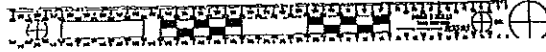
Forensic podiatry and/or podiatrists in their capacity as forensic experts have been accepted by forensic organizations, educational institutions, government entities, legal/attorney organizations, textbooks, periodicals, and scientific journals including: International Association for Identification, American Academy of Forensic Sciences, Chartered Society of Forensic Sciences, Organization of Scientific Area Committees (OSAC) for Forensic Science, Law Enforcement & Emergency Services Video Association International (LEVA), Indiana Prosecuting Attorneys Council, Illinois Public Defender Association, Los Angeles County District Attorney’s Office (California), Office of the State Public Defender (Iowa), Lake County District Attorney’s Office (Indiana) Australian & New Zealand Forensic Science Society, Canadian Identification Society, Brazilian Society of Forensic Sciences, New York College of Podiatric Medicine, Ohio College of Podiatric Medicine, Higher Center for Criminological Studies (Spain), British Association for Forensic Human Identification, Institute of Forensic Science and Criminology, Panjab University (India), University of Huddersfield, University of Staffordshire, University of Barcelona, British Chiropody and Podiatry Association, Royal College of Podiatry, Dundee University/Centre for International Forensic Assistance, University of Girona, Society of Chiropodists and Podiatrists, Office of the Forensic Science Regulator, Worshipful Society of Apothecaries, Spanish Society of Criminology and Forensic Sciences, National

Association of Podiatrists of Ecuador, New York College of Podiatric Medicine, Ohio College of Podiatric Medicine, Panjab University (India), Forensic Science Society, Podiatric Association of Australia, Criminal Cases Review Commission (UK), Council for the Registration of Forensic Practitioners, Hong Kong Podiatry Association, International Federation of Podiatrists, Podiatry New Zealand, Higher Center for Criminological Studies (Spain), University of Salford, Ontario Society of Chiropodists; the journals Science & Justice, Journal of the American Podiatric Medical Association, Journal of Forensic Science and Medicine, Journal of Forensic Identification, Journal of Clinical Forensic Medicine, Journal of Forensic and Legal Medicine, Research and Reports in Forensic Medical Science, Australian Journal of Forensic Science, Journal of Forensic Sciences, Medicine, Science and Law, Journal of Anatomy, Forensic Research & Criminology International Journal and Forensic Science International; the textbooks Forensic Podiatry: Principles and Methods, Forensic Gait Analysis: Principles and Practice, Forensic Human Identification, and Forensic Medicine of the Lower Extremity; the periodicals Criminal Justice (American Bar Association), Podiatry Management and Police Chief Magazine.

Appendix 2: linear measurement images



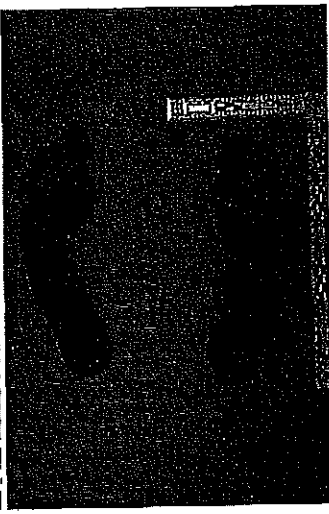
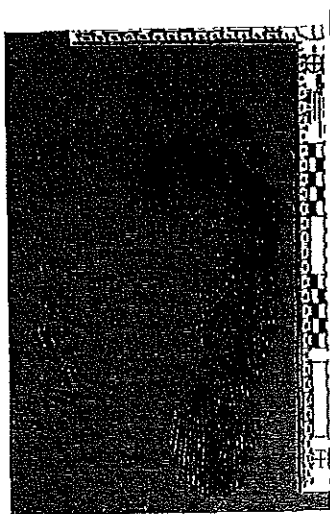
K-SF-A- Standing



K-SFA-6

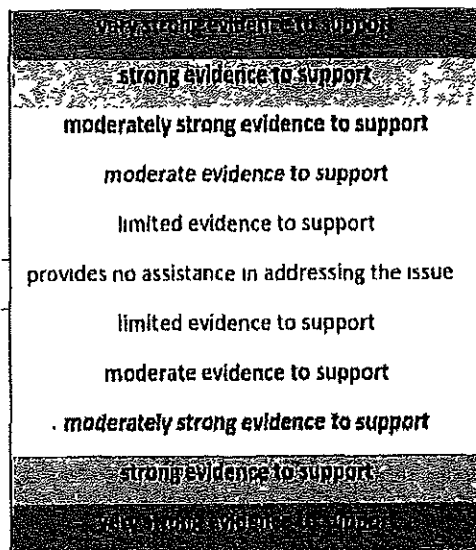


K-SF-B- Standing



Appendix 3: verbal expressions of support or rejection

The table below shows the hierarchy of verbal expressions of support or rejection used in the production of the forensic gait analysis report. The scale is a convention used in forensic science to show the strength of evidence being presented (Association of Forensic Science Providers 2009; European Network of Forensic Science Institutes 2015), and is based on the work of Cook et al and Evett et al (Cook et al 1998; Evett et al 1998; Evett et al 2000), and Matire et al (Matire et al 2014; Matire and Watkins 2015). In reaching the verbal level of support or rejection in this case, such conclusions are the opinion of the analyst based on their experience, similarly corroborated by the verifier, and are not based on numerical data or statistical calculation. The strength of conclusion represents a combination of factors, including the commonality of the observed features in the experience of the analyst, and the limitations in the report. As the categories of verbal expression move in either direction away from the midpoint of 'provides no assistance in addressing the issue', they increase in size, each category being ten times bigger. The escalation of the strength of support or rejection to the next category therefore becomes progressively more demanding.



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- Vernon DW, DiMaggio JA. *Forensic podiatry: principles and methods*. 2nd ed., CRC Press; 2017.
- Vernon, W., Reel, S. and Howsam, N., 2020. "Examination and interpretation of bare footprints in forensic investigations." *Research and Reports in Forensic Medical Science*, pp.1-14.
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Michael S. Nirenberg, D.P.M., B.Sc., B.A., FAENS

Clinical and Forensic Podiatrist

Dr. Nirenberg is a Board Certified podiatric physician and surgeon with more than 30 years of experience in private practice. He is also a forensic podiatrist and has assisted law enforcement in the analysis of footprints, footwear and gait. He served as an invited peer reviewer for scientific journals, including The Lancet, one of the highest rated medical journals.

He also is President of the American Society of Forensic Podiatry and a co-editor of the textbook "Forensic Gait Analysis: Principles and Practice," published by Taylor & Francis CRC Press.

Current: **Foot & Ankle Podiatric Physician and Surgeon**: Private Practice, Michael Nirenberg D.P.M., 1992-1995; Friendly Foot Care, P.C., 1995 – Present

Distinctions: **Fellow**, Association of Extremity Nerve Surgeons, Nov 2018 – Present.

Board Certified in Primary Care in Podiatry and Foot & Ankle Surgery, American Board of Multiple Specialties in Podiatry, 2006 – Present.

Editorial Board, Science & Justice, November 2022 - Present.

Editorial Board, Journal of American Podiatric Medical Association (forensic podiatry and nerve surgery), September 2022 - Present.

Certificate of Professional Competence in Forensic Gait Analysis, The Chartered Society of Forensic Sciences, August 2019 - 2022.

General Forensics Science and Practice Subcommittee, International Association for Identification, 2021 - Present.

Affiliate, Video/Imaging Technology and Analysis Subcommittee, **Chair** of the Exploratory Task Group on Gait Analysis, Organization of Scientific Area Committees (OSAC) for Forensic Science, 2022 - Present.

Diplomate, American Board of Forensic Podiatry, April 2017 – Present

President, American Society of Forensic Podiatry, June 2019 – Present.

President-Elect, American Society of Forensic Podiatry, February 2016–May 2019.

Board of Directors, American Society of Forensic Podiatry, 2006–January 2016.

Forensic Podiatry Subcommittee, International Association for Identification, 2008, 2017, 2018.

Distinguished Podiatric Medical Writing Award, American Podiatric Medical Writers Association, May 1991.

First Student Published in the Journal of the American Podiatric Medical Association without a Physician-Coauthor, May 1989.

SELECT PUBLICATIONS

Podiatric Medicine

- Nirenberg, M , Segura, R.P., “The Utility of the Tinel Sign in the Diagnosis of High Tarsal Tunnel Syndrome,” Journal of the American Podiatric Medical Association (accepted 05/09/2023)
- Segura, R.P , Nirenberg, M.S., “High Tibial Nerve Entrapment: a Common Component of Tarsal Tunnel Syndrome,” Journal of the American Podiatric Medical Association (accepted 2/16/2023).
- Nirenberg, M., Segura, R., Segura, A , Schnack, L , Forsthoefel, C., Dachman, C., “Electrophysiological Evidence of Concomitant Focal Nerve Entrapments in Persons with Rheumatoid Arthritis: a Cross-Sectional Study,” Journal of the American Podiatric Medical Association (accepted 1/17/2023)
- Segura, R.P , Nirenberg, M S , “Prevalence of Obesity in High Tarsal Tunnel Syndrome: A Cross-Sectional Study,” Journal of the American Podiatric Medical Association (accepted 7/26/2022)
- Nirenberg, M , “Hallux Valgus Surgery: A Technique to Assist with Soft-Tissue Correction” Orthopaedic Journal at Harvard Medical School (accepted 4/15/2022).
- Nirenberg, M.S , Requena L.C , Garriga C., Smith, G.T., McClain S A., “Histopathology of Persistent COVID Toe: A Case Report,” Journal of Cutaneous Pathology, 2022,49(9) 791-794.
- Nirenberg, M S “Complex Regional Pain Syndrome of the Foot and Ankle: Treatment at the Early Onset with an Anesthetic Ankle Block,” Pain Medicine Case Reports, 2021, 5(7), 373-77.
- Nirenberg, M.S. “Complex Regional Pain Syndrome and the Importance of Early Diagnosis,” Orthopaedic Nursing. July/August 2021, 40(4), 204-208

- Nirenberg, M.S. with Pradeep A. "Commentary on Chronic Madura foot: mycetoma and/or *Actinomyces* spp or Actinomycosis," [by Gannass, A A , BMJ Case Rep 2018] Foot & Ankle Quarterly. Summer 2021, 32(2), 81-83
- Nirenberg, M S "Injection of the Abductor Hallucis Muscle Assists with the Diagnosis and Treatment of Distal Tarsal Tunnel Syndrome," Journal of the American Podiatric Medical Association (accepted 4/14/2021)
- Nirenberg, M.S. "Commentary on Pernio-Like Skin Lesions Associated with COVID-19: A Case Series of 318 Patients from Eight Countries," [by Freeman, E.E., McMahon, D E , et al. *J Am Acad Dermatol* 2020 Aug;83(2) 486-492.] Foot & Ankle Quarterly. Summer 2021, 32(2), 54-56.
- Nirenberg, M.S , Ansert E., "Saphenous Nerve Denervation for Chronic Pain After Compartment Syndrome of the Foot: A Case Report," Journal of the American Podiatric Medical Association Sept 2021;111(5).
- Nirenberg M.S. "Author's Response to Letter from Drs. Vetrano, Devigili and Nazzi " Acta Neurochirurgica (The European Journal of Neurosurgery) August 2020,162(8).1927 (Invited Letter).
- Nirenberg, M S , Mar Ruiz Herrera, M. "Foot Manifestations in a Patient with COVID-19 and Epstein-Barr Virus: a Case Study," The Foot. 2021;46, 101707.
- Nirenberg, M S , Mar Ruiz Herrera, M "Foot Manifestations in a COVID-19 Positive Patient: A Case Study," Journal of the American Podiatric Medical Association, May 4, 2020.
- Nirenberg, M. "A Simple Test to Assist with the Diagnosis of Common Fibular Nerve Entrapment and Predict Outcomes of Surgical Decompression" Acta Neurochirurgica (The European Journal of Neurosurgery), April 23, 2020:1-6
- Nirenberg, M S , Ansert, E "Vascular Assessment of the Foot Surgery Patient" Orthopaedic Nursing March/April 2020, 39 (2), 114-118
- Nirenberg, M S "Black Bone Disease of the Foot: A Case Study of Minocycline-Induced Bone Pigmentation," Current Orthopaedic Practice, September/October 2019; 30(5) 487-9.
- Nirenberg, M S. "Midfoot Plantar Fascia Tear Mimicking Plantar Fibroma," The Journal of the American Podiatric Medical Association, Jan 2019, 109 (1), 87-90.
- Nirenberg M S , "Avoiding Missteps With Foot and Ankle Injuries," Workers' Compensation, June/July 2015, Vol. 1, No 3, pp 38-40.
- Nirenberg, M S , Carroll M., "Atypical Gout in the Foot Secondary to Primary Hyperparathyroidism," Journal of the American Podiatric Medical Assoc., May 2007.

- Leavitt K.M., Nirenberg, M S , Wood, B and Yong, R.M , “Titanium Hemi-Great Toe Implant: A Preliminary Study of Its Efficacy,” The Journal of Foot Surgery, May 1991.

Forensic Podiatry

- Ansert E., Nirenberg M S., et al , “Ghosting Phenomenon in Static and Dynamic Footprints in India and the United States,” Science & Justice, 2023 May, 65(3);406-413
- Nirenberg M S , “Gait: How Video of a Criminal Can Acquit or Convict” Criminal Justice magazine, American Bar Association, 2023 Spring 38 (01):14-21
- Nirenberg M S , Birch I., Cuddyer J. “An Introduction to Forensic Gait Analysis,” Identification News, International Association for Identification, 2022, Oct/Nov/Dec;52(4):6
- Nirenberg M S., “Footwear-to-Feet Examination and Analysis: Comparing Worn Footwear to Persons and Human Remains,” Science & Justice (online 11/23/2022).
- Nirenberg M S , Ansert E., Reel S , “Reliability of a two-dimensional sock-clad footprint linear measurement method,” Science & Justice, 2021 Sep 1;61(5):649-56
- Mukhra R , Krishan K., Nirenberg M , et al. “The Contact Area of Static and Dynamic Footprints – Forensic Implications,” Science & Justice, 2021 Mar 1;61(2):187-92
- Birch I , Nirenberg M , Vernon W., Birch M , editors, “Forensic Gait Analysis: Principles and Practice textbook,” 2020, Taylor & Francis CRC Press, Boca Raton, Florida
- Nirenberg M.S , Ansert E , Campbell J , Curran M., “Chasing Ghosts: An Investigation of the Ghosting Phenomenon in Footprints,” Science & Justice, 2020 Sep,60(5):432-7
- Nirenberg M.S , Ansert E , Campbell J , Curran M., “Forensic Implications of Foot Arch Index Comparison between Dynamic Bare Footprints and Shoe Insole Foot Impressions,” Science & Justice, 2020 Jul.60(4):375-80.
- Mukhra R., Krishan K., Nirenberg M.S., Ansert E., Kanchan T., (2020) Comparative analysis of static and dynamic bare footprint dimensions in a north Indian population, Forensic Science International, 2020 Mar 1. 308: p 110169.
- Nirenberg M S., Ansert E , Krishan K., Kanchan T “Two-Dimensional Metric Comparisons between Dynamic Bare Footprints and Insole Foot Impressions - Forensic Implications,” Science & Justice, 2020, 60 (2), pp. 145-150
- Nirenberg M S , Saxelby J , Vernon R , Vernon W., "The Application of Forensic Podiatry to Clinical Practice," Journal of the American Podiatric Medical Association, 2020, 110 (2) Article_9
- Nirenberg, M.S., Ansert, E , Krishan, K. and Kanchan, T , “Two-dimensional linear analysis of dynamic bare footprints: A comparison of measurement techniques,” Science & Justice, 2019, Vol 59, Issue 5, pp. 552-557

- Nirenberg, M.S., Ansert, E., Krishan, K. and Kanchan, T., "Two-dimensional metric comparisons between dynamic bare and sock-clad footprints for its forensic implications—A pilot study," Science & Justice, 2019, Vol 59, Issue 1, pp 46-51
- Nirenberg M., Vernon W., Birch I , "A review of the historical use and criticisms of gait analysis evidence," Science & Justice, 2018, Vol 58, Issue 4, pp 292-298
- Nirenberg, M.S , Krishan K., Kanchan T. "A metric study of insole foot impressions in footwear of identical twins," Journal of Forensic and Legal Medicine, 2017; 52:116-121
- Nirenberg, M.S "Frye Test and Daubert Standard" In DiMaggio J.A. & Vernon W., Forensic Podiatry. Principles and Methods (2nd ed.), 2017, Boca Raton: CRC Press.
- Nirenberg M.S., "Meeting a Forensic Podiatry Admissibility Challenge: A Daubert Case Study," Journal of Forensic Sciences, 2016, 61. 833–841
- Vernon W., Nirenberg, M., "Letter to Editor: In Defense of Forensic Science," Boston Review, February 18, 2016
- Nirenberg, M.S. "Gait, Footprints, and Footwear: How Forensic Podiatry Can Identify Criminals," Police Chief Magazine 83 (Jan 2016). web only.
- Nirenberg M S , "Book Review: Forensic Podiatry: Principles and Methods," Journal of the American Podiatric Medical Association, May 2014
- Nirenberg, M., "Author's Response to Letter: New Method for Examining the Inside of Footwear," Journal of Forensic Identification, 2009, Vol 59, No 6 (Invited Letter).
- Vernon W, Brodie, DiMaggio, Gunn, Kelly, Nirenberg, Reel, Walker, "Forensic podiatry: role and scope of practice," International Association for Identification, April 2009
- Nirenberg M.S , "New Method of Examining the Inside of Footwear," Journal of Forensic Identification, June 2008, Vol. 58, Number 3, pp. 297-304.
- Nirenberg, M.S., "Forensic Methods and the Podiatric Physician," The Journal of the American Podiatric Medical Association, May 1989

LECTURES AND PRESENTATIONS

Podiatric Medicine

- Nirenberg M S , "Diabetic Neuropathy: What Patients Can't Feel Can Hurt Them," Midwest Podiatry Conference, ASPMA agenda, Chicago, IL, March 6, 2023 (Invited Speaker).
- Nirenberg M S, "Complex Regional Pain Syndrome: Early Intervention Shows Benefit," Association of Extremity Nerve Surgeons Annual Symposium, Fort Worth, TX, November 6, 2022

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- Nirenberg M.S, Segura, R.P , **“High Tarsal Tunnel Syndrome: An Association with Obesity,”** Association of Extremity Nerve Surgeons Annual Symposium, Fort Worth, TX, November 6, 2022
- Nirenberg M S , **“Achilles Tendon Rupture: Diagnosis and Management,”** Ontario Society of Chiropractors 35th Anniversary Conf (webinar), Toronto, Canada, May 8, 2021
- Nirenberg M S, **“Overlooked Nerve Problems as a Cause of Foot & Ankle Pain,”** Ontario Society of Chiropractors 35th Anniversary Conf. (webinar), Toronto, Canada, May 8, 2021
- Nirenberg M S, **“Management of Lower Extremity Nerve Problems,”** Galilee Medical Center, Nahariya, Israel (webinar), February 9, 2021.
- Nirenberg M.S, **“A Simple Method to Diagnose & Treat Myofascial-Related Nerve Entrapments,”** Association of Extremity Nerve Surgeons Annual Symposium, Tempe, AZ (webinar), November 7, 2020.
- Nirenberg M.S, **“Gait Analysis: Clinical & Forensic Applications,”** [video] provided to the American Society of Forensic Podiatry, April 2020.
- Nirenberg M., **“Simple Measures to Reduce Serious Foot and Ankle Complications,”** Indiana Podiatric Medical Association's 94th Annual Fall Convention, Indianapolis, IN, October 12, 2019 (Invited Speaker).
- Nirenberg M S, **“Inflight Emergency: A Podiatrist's Experience Treating an Unresponsive Passenger,”** Indiana Podiatric Medical Association's 94th Annual Fall Convention, Indianapolis, IN, October 12, 2019 (Invited Speaker)
- Nirenberg M S, **“Podiatric Medicine in Health and Legal Matters,”** State Farm Insurance, Litigation Counsel, Crown Point, IN, April 24, 2018
- Nirenberg, M, Minhas, H., **“Workplace Foot & Ankle Injuries: Diagnosis, Treatment and Return to Work,”** Indiana Workers Compensation Institute, Merrillville IN, June 2015.
- Nirenberg M , **“Foot and Ankle Problems: An Introduction for Salon Professionals,”** Crown College of Cosmetology, Crown Point, April 2010; Don Roberts Cosmetology School, Schererville, August 2010.
- Nirenberg M , Lacey, M., **“Foot & Ankle Pain,”** Arthritis and You seminar, Arthritis Foundation of Greater Chicago, St Anthony Medical Center, Crown Point, IN, Oct 2010.
- Nirenberg M , **“Podiatric Medicine,”** Indiana University Northwest, Nov 17, 2009.
- Nirenberg M., **“Diabetes and Foot Health,”** Methodist Hospital, Gary, IN, July 2009
- Nirenberg M., **“Breakthrough Treatments for Arthritis in the Feet,”** Arthritis Foundation of Greater Chicago, May 1, 2008.
- Nirenberg M., **“Foot and Ankle Problems: An Introduction for Salon Professionals,”** Excel Academy of Cosmetology, November 15, 2007

- Nirenberg M , **"Nerve Problems & Neuropathy of the Foot and Ankle,"** St. Mary Medical Center, Merrillville, IN, June 2006
- Nirenberg M., **"The Latest Treatments for Foot & Ankle Pain,"** Arthritis Foundation of Chicago, 2005
- Nirenberg M., **"Diagnostic Ultrasound of the Foot & Ankle,"** Podiatric Surgical Residency, Merrillville, IN, September 2004
- Nirenberg, M., **"New Techniques to Treat Foot & Ankle Pain,"** Arthritis Foundation of Chicago, 2004
- Nirenberg, M., Williams B, **"Pigmented Villonodular Synovitis: A Case Study and Literature Review,"** Indiana Podiatric Medical Association Convention, Indianapolis, IN, October 20, 1992

Forensic Podiatry

- Nirenberg M , **"Gait as Criminal Evidence: Scientific Foundations and Analysis,"** American Society of Forensic Podiatry, [webinar], June 13, 2023
- Nirenberg, M.S , **"Forensic Podiatry: An Introduction for Attorneys,"** [webinar], Los Angeles County District Attorney's Office, Los Angeles, CA, April 20, 2023.
- Nirenberg, M,* Krishan K, **"The Analysis of Feet, Footprints, and Gait—How Principles of Forensic Podiatry Assist in Criminal Investigations,"** (*speaker), American Academy of Forensic Sciences Annual Scientific Conference, Orlando, FL, February 2023
- Nirenberg M., **"Forensic Gait Analysis: How Video of a Criminal Can Acquit or Convict,"** [webinar], Office of the State Public Defender, Des Moines, IA, Jan 27, 2023, [webinar] 2023 Illinois Public Defender Association Spring Seminar, June 2, 2023.
- Nirenberg M., **"Connecting Feet to Footwear: Scientific Foundations, Analysis and a Case Study,"** International Association for Identification Conf , Omaha, NB, August 2022.
- Nirenberg M., **"The Autumn Andy Homicide: A "Feet-to Shoes" Case Study,"** American Society of Forensic Podiatry, [webinar], March 2022.
- Nirenberg M., **"Forensic Podiatry: Scientific Foundations & Casework,"** [webinar] Temple University School of Podiatric Medicine Forensic Club, Philadelphia, 3/2022, Kent State University College of Podiatric Medicine Forensic Club, Independence, OH, 10/2022
- Nirenberg M , **"Interpreting Footprint Evidence: Principles & Case Studies,"** Master Degree in Crime Scene Investigation: Forensic Analysis of Footprints, Higher Center for Criminological Studies, Valladolid, Spain [webinar], February 2022 (Invited Speaker)

- Nirenberg M., **"Forensic Gait Analysis: Scientific Foundations,"** Video/Imaging Technology and Analysis Subcommittee within the Organization of Scientific Area Committees for Forensic Science (OSAC), [webinar], December 2021
- Nirenberg M., **"Forensic Gait Analysis: Principles, Analysis and Casework,"** [webinar] International Lecture Series, Institute of Forensic Science and Criminology, Panjab University, Chandigarh, India, October 2021 (Invited Speaker).
- Nirenberg M , **"Forensic Podiatry: Principles for Tracking Professionals,"** Pacific Crest Trackers Association [webinar], October 2021.
- Nirenberg M , **"Analysis of Sock-Clad Footprints: Methods and Cautions from Casework and Research,"** American Society of Forensic Podiatry, [webinar], Sept. 2021.
- Nirenberg M , Vernon W , **"Shoe Wear Analysis: A Case Study Showing the Need for Appropriate Expertise and Evidence-Based Practice,"** International Association for Identification, Nashville, TN, August 2021.
- Vernon W., Nirenberg M , **"Forensic Gait Analysis: A Case Study of Multiple Criminals with Complex and Unusual Gait Issues,"** International Association for Identification, Nashville, TN, August 2021.
- Nirenberg M.S, **"The Forensic Analysis of Gait and Pedal Evidence: Case Studies and Clinical Applications,"** Ontario Society of Chiropractors 35th Anniversary Conference (webinar), Toronto, Canada, May 8, 2021 (Invited Speaker).
- Nirenberg M S, **"The Forensic Podiatrist: Legal Issues and Challenges,"** American Society of Forensic Podiatry [webinar], March 2021.
- Krishan K ,* Nirenberg M S, **"Forensic Podiatry—An Overlooked Science in the Analysis of Feet, Footprints, Gait, and Tracks,"** (*speaker), American Academy of Forensic Sciences Annual Meeting, (webinar) February 2021
- Nirenberg M.S , **"Forensic Gait Analysis—Scientific Foundations, Applications, and a Case Study,"** American Academy of Forensic Sciences Annual Meeting (webinar) 2/2021
- Krishan K.,* DiMaggio J.A , Nirenberg M S., **"Footprint Analysis: Data From North India Study Suggests New Features for Individualization and Biologic Profiling,"** (*speaker), American Academy of Forensic Sciences Annual Scientific Meeting, (webinar), Feb 2021.
- Nirenberg M S, **"Forensic Analysis of Footprints: History, Scientific Foundations and Case Examples,"** Master Degree in Crime Scene Investigation: Forensic Analysis of Footprints, Higher Center for Criminological Studies, Valladolid, Spain (webinar) February 2021 (Invited Speaker)
- Nirenberg M.S., **"Forensic Podiatry: Examining Gait, Footprint and Footwear Evidence,"** [webinar] College of Podiatric Medicine, Kent State University, Forensic Club, Independence, OH, January 7, 2021; Temple University School of Podiatric Medicine Forensic Club, Philadelphia, PA, March 4, 2021

- Nirenberg M S., **"Forensic Analysis of Gait and Pedal Evidence,"** Barry University School of Podiatric Medicine, Forensic Club [webinar], Miami Shores, FL, Nov 17, 2020.
- Nirenberg M S , **"Forensic Podiatry: An Update on the State of the Specialty,"** 2020 Virtual Midwest Podiatry Conference (on-demand session, 11/6-12/31), October 2020
- Nirenberg M.S., **"Foot Impressions: Forensic & Clinical Applications,"** American Society of Forensic Podiatry [webinar], August 2020
- Nirenberg M S., **"Forensic Gait Analysis: The State of the Science and a Case Study,"** American Academy of Forensic Sciences Scientific Meeting, Anaheim, CA, February 2020.
- Nirenberg M *, Krishan K., **"Linking Footprints to Feet: Research Advances and a Daubert Case Study,"** (* speaker), American Academy of Forensic Sciences Annual Scientific Meeting, Anaheim, CA, February 2020.
- Nirenberg M., **"Forensic Podiatry: An Overlooked Practice-Building Opportunity,"** American Academy of Podiatric Practice Management, Daytona, FL, November 2019
- Nirenberg M , **"The Scientific Foundations of Forensic Gait Analysis,"** American Society of Forensic Podiatry [webinar], October 2019
- Nirenberg M , **"Bare Versus Sock-Cloth Footprint Analysis: Lessons Learned from Casework and Research,"** International Assoc for Identification, Reno NV, Aug 2019.
- Nirenberg M., **"Forensic Gait Analysis: the Basics of Interpreting Gait Evidence,"** International Association for Identification, Reno, NV, August 2019.
- Nirenberg M., **"Forensic Podiatry Analysis of Foot and Gait Evidence,"** College of Podiatric Medicine Forensic Club, Kent State (webinar), Independence, OH, Apr. 2019.
- Nirenberg M., **"Principles of Pedal Evidence,"** Temple University School of Podiatric Medicine, Forensics Club [webinar], Philadelphia, PA, November 27, 2018
- Nirenberg M., **"Linking Feet to Shoes: Lessons from a Case Study and Adult Twin Research,"** International Association for Identification, San Antonio, TX, August 2018.
- Nirenberg M., **"Accuracy in Forensic Gait Analysis: An Illustrative Case Study,"** International Association for Identification, San Antonio, TX, August 2018.
- Birch I., Nirenberg M., **"Forensic Gait Analysis for Video Analysts: Basic Concepts and a Case Study,"** International Association for Identification, San Antonio TX, 2018.
- Birch, I , Nirenberg M., **"Forensic Gait Analysis: Questions Raised and Answers Given,"** International Association for Identification, San Antonio, TX, August 2018.

- Nirenberg M , **“Podiatric Analysis of Crime Scene Footprints,”** California College of Podiatric Medicine [webinar], Oakland, CA, January 26, 2018.
- Nirenberg M., **“Forensic Gait Analysis: What Every Video Analyst Needs to Know,”** Law Enforcement & Emergency Services Video Association's 28th annual Digital Multimedia Evidence Training Symposium, Clearwater, FL, October 2017
- Nirenberg M., **“Forensic Examination of Footprints,”** Temple University School of Podiatric Medicine Forensic Club [webinar], Philadelphia, PA, October 4, 2017
- Nirenberg M., **“Footprints in Court: Meeting a Daubert Challenge,”** International Association for Identification Educational Conference, Atlanta, GA, August 2017
- Combs, L , Nirenberg, M , Weatherly, L , **“Lower Extremity Injuries and Malpractice: Identifying False or Exaggerated Claims,”** Claims Litigation Management & Business Insurance Workers' Compensation Conference, Chicago, IL, May 24, 2017.
- Nirenberg M., **“Footprint Analysis: A Homicide Case Study,”** American Society of Forensic Podiatry [webinar], March 28, 2017
- Nirenberg M , **“Footwear Analysis in Criminal Investigations,”** Barry University School of Podiatric Medicine, Forensic Club [webinar], Miami Shores, FL, Mar 14, 2017
- Krishan K.*, DiMaggio J., Nirenberg, M , **“Analyzing Bare Footprints in Criminal Cases — Interpreting a Large-Scale Footprint Study in India,”** (* speaker), American Academy of Forensic Sciences Annual Meeting, New Orleans LA, February 2017
- Nirenberg M , **“How Podiatry Principles Can Assist in the Forensic Analysis of Gait, Footwear and Footprints,”** [webinar] Barry University School of Podiatric Medicine, Forensic Club, Miami Shores, FL, May 24, 2016
- Nirenberg M , **“Forensic Podiatry — How Gait, Footwear, and Footprints Convict Criminals,”** American Academy of Forensic Sciences Annual Scientific Meeting, Las Vegas, NV, February 2016.
- Nirenberg M , **“Forensic Podiatry Analysis of Footprints: A Case Study in Identifying a Killer,”** Rosalind Franklin University of Medicine & Sciences, North Chicago IL, Jan. 2016.
- Nirenberg M , **“Footprint Workshop: Basic Forensic Podiatry Principles of Footprint Interpretation,”** Rosalind Franklin University of Medicine & Sciences, North Chicago, IL, January 2016.
- Nirenberg M., **“Scientific Principles of Using Gait, Shoes & Footprints to Convict Criminals,”** Rosalind Franklin University of Medicine & Sciences, North Chicago, IL, August 2015
- Nirenberg M., **“Footprint and Footwear Analysis for State Police,”** Indiana State Police, Lowell, IN, April 21, 2015

- Nirenberg M , **"Principles of Foot-Related Evidence for Attorneys,"** Lake County Prosecutor's Office, Hobart, IN, April 8, 2015
- Nirenberg M , **"Footprint Evidence Principles for Crime Scene Technicians,"** Northwest Indiana Law Enforcement Personnel, Munster IN, Feb. 2015.
- Nirenberg M., **"Forensic Podiatry: How Footprints, Footwear and Gait Can Convict Criminals,"** Lincoln-Way High School, Frankfort IL, October 4, 2013.
- Nirenberg M , **"Forensic Podiatry: What Criminal Justice Students Should Know About Foot-Related Evidence,"** Indiana University Northwest, Gary IN, March 2011.
- Nirenberg M., **"Forensic Podiatry: The Basics of Footprint and Shoe Forensics,"** Purdue University, Hammond IN, November 2011.
- Nirenberg M , **"Forensic Podiatry: An Introduction to Footprints, Feet and Footwear for Undergraduate Students,"** Valparaiso University, IN, November 9, 2010.
- Nirenberg M , **"Forensic Podiatry: Footprint & Footwear Analysis for Law Enforcement,"** Northwest Indiana Law Enforcement Academy, Hobart, IN, April 2008.
- Nirenberg M., **"Forensic Podiatry: How Feet Can Convict Criminals,"** Indiana Podiatric Medical Association, Indianapolis, IN, September 20, 2008
- Nirenberg M , **"Forensic Podiatry: The Newest IAI Discipline,"** International Association for Identification International Conference, Louisville KY, August 2008
- Nirenberg M., **"The Value of Footwear and Footprints in Forensic Science,"** Footprints & Shoeprints Forensic Seminar, Ohio College of Podiatric Medicine, Independence OH, June 2008 (Invited speaker)
- Nirenberg M , **"Footwear Forensics: Sizing and Fiber Optic Analysis,"** Footprints & Shoeprints Seminar, Ohio College of Podiatric Medicine, Independence, OH, June 2008 (Invited Speaker)
- Forman M., Vernon W., Wasowicz M , Kennedy R , Nirenberg M , **"Case Applications,"** Footprints & Shoeprints Seminar, Ohio College of Podiatric Medicine, Independence OH, June 2008 (Invited Speaker)
- Nirenberg M., **"Forensic Podiatry: Essentials of Footprint and Footwear Evidence for Law Enforcement,"** Northwest Indiana Law Enforcement Academy, Hobart, April 2008.
- Nirenberg M , **"CSI Podiatry: What Podiatrists Need to Know to Help Law Enforcement,"** Midwest Podiatry Conference, Chicago IL, March 30, 2008.
- Nirenberg M., **"Forensic Podiatry: Information on Feet, Footprints and Footwear for Law Enforcement,"** The Indiana Intelligence Fusion Center, a division of the Department of Homeland Security, December 11, 2007.

- Nirenberg M., **“Forensic Podiatry: What Law Enforcement Should Know About Footprint and Footwear Evidence,”** Lake County Detectives, IN, Sept. 2007
- Nirenberg M., **“Forensic Podiatry - What Investigators Need To Know About Footwear and Footprints,”** Indiana Division of the International Association for Identification Educational Conference Evansville IN, October 2007. (Featured Speaker)

CONTINUING EDUCATION

Podiatric Medicine

- Ethics in Podiatry (one day program) – 10/2021.
- Midwest Podiatry Conference – regular attendance thru 2018, 2020-2023.
- Ontario Society of Chiropractors 35th Anniversary Conference – 2021.
- The Association of Extremity Nerve Surgeons Annual Symposium - 2018 thru 2022.
- Indiana Podiatric Medical Association conference - 2009, 2012, 2013, 2019
- Podiatry Institute and PICA Risk Management - 1992 – 2003.

Select Specialized Training

- **“SPR Education Course (SPRINT Percutaneous Nerve Stimulation),”** A Abd-Elsayed, M. Aman, D Dickerson, M Huntoon, Downers Grove, IL, January 21, 2023.
- **“Advance Nerve Repair, Stim Update & Open Dissection,”** Association for Extremity Nerve Surgeons, Fort Worth, TX, November 4, 2022.
- **“Lapidplasty Advanced Skills Course,”** Lapidplasty Symposium, Chicago, IL, October 16, 2021. **Lapidplasty Bioskills Training Course,** Merrillville, IN, July 21, 2023.
- **“Advanced Peripheral Nerve Course,”** Association for Extremity Nerve Surgeons, Kennebunkport, ME, May 3-4, 2019.
- **“Safe and Responsible Treatment of Pain in an Opioid Epidemic”** A Lahood, Indiana Podiatric Medical Association Convention, October 12, 2019
- **“Fundamental Peripheral Nerve Surgery Course,”** Association for Extremity Nerve Surgeons, New Orleans, LA, November 7-9, 2018.
- **“GraMedica Didactic & Hands-on Training Course,”** Michael Graham, GraMedica, Macomb, MI, September 13, 2018.
- **“Peripheral Nerve Intro Skills Lab - Diagnostics, Tarsal Tunnel & Nerve Repair,”** Andrew Rader, Association of Extremity Nerve Surgeons, Chicago IL, April 21, 2018.

- **“Opioid Prescribing: Legal & Social Implications, Risks and Rewards,”** St Mary Medical Center Continuing Medical Education, Hobart IN, April 14, 2018.
- **“Completion of HyProCure Online Physician Training,”** Graham International Implant Institute, Macomb, MI, accessed October 2017
- **Laser Science & Safety,** American National Standard for the safe use of lasers in Health Care Facilities, Laser Training Institute, Broadwest Specialty Surgical Center, April 2014.
- **Responsible Prescribing – Redefining the Standards of Care - (webinar),** J Reed, M. Rinebold, Indiana State Medical Association, accessed November 30, 2013.
- **“Walk With Ease” Leader Training,** Arthritis Foundation, Atlanta, accessed Oct. 2013
- **“Dermal Regeneration Products Physician Training Program,”** Integra LifeSciences, Crown Point, IN, May, 4, 2006.
- **“Lower Extremity Peripheral Nerve Surgery: Advanced Workshop,”** A. Lee Dellon, Institute for Peripheral Nerve Surgery, Baltimore, MD, April 2005.
- **“Neurosensory & Motor Testing Certified Administrator,”** Sensory Management Services, Baltimore, MD, April 2005
- **“Practical Application & Diagnostic Theory in Podiatric Ultrasound,”** D. Lin, Esaote PIE Medical, Indianapolis, IN, August 2004.
- **“OssaTron Physician Training for Plantar Fasciitis,”** Roy Brown, September 6, 2001
- **“Subtalar Maxwell-Brancheau Arthroereisis Surgical Procedure Training Certification,”** J Pflieger Galt, KMI, March 31, 2000.
- **“Comprehensive Training Seminar on Vascular Procedures using Cynosure Laser System,”** R A Giergerich, Cynosure, February 2000.
- **“Arthroscopy of the Foot and Ankle Course,”** C.W Kelley, Chicago, IL, April, 1994.

Select Forensic Training

- **“Chemical Use to Enhance and Detect Bloodstains Workshop,”** S. Plotkin, International Association for Identification Conference, Omaha, NB, August 2022
- **“Alternate Light Sources in Forensic Photography and Imaging Workshop,”** D. Doglietto, M. Hullahan, International Association for Identification Conference, Omaha, NB, August, 2022
- **Tracking Lectures.** Counter-Tracking and Deception, T Lorange, Joel Hardin Professional Tracking Services (JHTS), 8/29/20, Law Enforcement Tracking, K Decker, JHTS, 6/17/21, Moving a Line of Sign, T. Rhoads, JHTS, 2/6/21; Recognition and Identification of Sign, C. Portal, JHTS, 6/21/20, Urban Tracking Concepts, M. Lemasters, JHTS, 7/12/21 (accessed online August 2021).

CURRICULUM VITAE
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- **“Wear Examination on Shoe Prints Workshop,”** John Vanderkolk, 104th International Association for Identification Conference, Reno, NV, Aug 2019.
- **“Crime Scene Investigation Series: Blood Stain Evidence Workshop,”** T. Wolson, H Latham, International Assoc. for Ident. Conf., Reno, NV, Aug. 2019
- **“Photographic Comparison workshop,”** K. Meline and W. Bruehs, 103rd International Association for Identification Conference, August 2018
- **American Academy of Forensic Sciences Annual Meeting,** 2015, 2020, 2021, 2023.
- **International Association for Identification Conference,** 2015-2019, 2021, 2022
- **“Forensic Gait Analysis workshops,”** I. Birch (2022, 2018), S Reidy, I. Birch (2017), I Birch (2016), W. Vernon, I Birch (2015), International Association for Identification Conf.
- **“Photoshop Forensic Video Analysis Workflow: A Comprehensive Workshop,”** G. Reis, Law Enforcement & Emergency Services Video Assoc , Clearwater, FL, Oct 2017
- **“Comparison of Plantar Friction Ridge Impressions workshop,”** J. Stimac, International Association Annual Conference, Atlanta, GA, August 2017
- **“Introduction to the Human Foot in Forensic Evaluation: Foot structure, function and barefoot analysis workshop,”** David Agoada and Steven Wachter, International Association for Identification Conference, August 2016
- **“Basic Reverse Projection Photogrammetry workshop,”** Kimberly Meline and Walter Bruehs, International Association for Identification Conference, August 2016
- **“Forensic Imaging Techniques Course,”** George Reis, Law Enforcement & Emergency Services Video Association, Indianapolis, IN, September 2016
- **“Documentation and Recovery of 2D Footwear Impression Evidence Workshop,”** Jason Cole, International Association for Identification Conference, August 2015
- **“A Study of the Comparison of Inked Barefoot Impressions to Barefoot Impressions Inside the Shoe,”** L Hammer, Impression and Pattern Evidence Symposium 2012, accessed online February 2015.
- **“Foot Morphology Standards”** Shelly Massey, Impression and Pattern Evidence Symposium 2012, accessed online February 2015
- **“Barefoot Comparison and Impressions in Footwear”** Shelly Massey, Impression and Pattern Evidence Symposium 2012, accessed online February 2015.
- **“Forensic Podiatry Instructional Program,”** Podiatry Management, accessed online, Feb , 2015

- “Footprints & Shoeprints Forensic Seminar,” Ohio College of Podiatric Medicine, Cleveland, OH, 2008.
- “Detection, Recovery & Examination of Footwear Impression Evidence,” William Bodziak, Bodziak Forensics, Jacksonville, FL, 2007.
- “Examination & Comparison of Footwear Evidence,” Dwane Hilderbrand, Ron Smith & Associates, Largo, FL, 2007
- “Footwear & Tire Track Evidence,” Michael Wasowicz, Imprimus Forensic Services, Glenview, IL, 2007.

OTHER ROLES

- Forensic Gait Analysis Case Verification (multiple cases) 2020, 2021, 2022, 2023.
- Invited Peer Reviewer, Congenital Anomalies, April 2023.
- Invited Peer Reviewer, The Science of Nature, Jan 11, 2023, Jan 28, 2023; April 2023.
- Invited Peer Reviewer, J of Forensic Science and Medicine, June 2022, May 2023.
- Invited Peer Reviewer, Computational and Structural Biotechnology, March 2022
- Invited Peer Reviewer, Journal of Clinical Tuberculosis and Other Mycobacterial Diseases, May 2021
- Invited Peer Reviewer, The Journal of Infection in Developing Countries, February 2021, April 2021, June 2021, January 2023
- Invited Peer Reviewer, The Lancet, July 2020.
- Invited Peer Reviewer, Current Orthopaedic Practice, October 2019, March 2020, June 2020, October 2020, December 2020, April 2021, April 2022
- Invited Peer Reviewer, Forensic Science International, February 2020.
- Invited Peer Reviewer, Science & Justice, July 2019, March 2020.
- Research Participant, study of the overlay method for in-shoe foot impression comparison Nicolas Howsam, University of Huddersfield, UK, May 2019.
- Utilization Review Committee, Pinnacle Hospital, Merrillville, IN, 2018 – 2023
- Invited Peer Reviewer, Journal of the American Podiatric Medical Association, May 2017, June 2022.
- Quality Committee, Pinnacle Hospital, Merrillville, IN, 2016 - 2023
- Infection Control Committee, Pinnacle Hospital, Merrillville, IN 2016 – 2023

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- **Podiatric Physician Student Mentor**, American Association of Colleges of Podiatric Medicine, 2008–2018
- **Member, “Seal of Approval” Committee**, American Podiatric Medical Association, 2008 – 2010.
- **Assisted in surgical training of podiatry residents**, St. Mary Medical Center & MHC Surgery Center Podiatric Surgical Residency, 1992 – 2007.
- **“Arthritis Foundation ‘Walk With Ease’ Class Instructor,”** Munster Park District, Munster, IN, 2013.

EDUCATION

- **Podiatric Surgical Residency**, MHC Surgical Center (Merrillville, IN) and St. Mary Medical Center (Gary – Hobart, IN) 1991 – 1992
- **Doctor of Podiatric Medicine**, Dr. William M Scholl College of Podiatric Medicine, Chicago, IL, 1991
- **Bachelor of Science Degree**, Dr William M. Scholl College of Podiatric Medicine, Chicago, IL, 1991.
- **Podiatric Externships** , S. Gorgol, Salem, NH, K. Leavitt, Northeast Podiatric, Wilmington, MA, J. McCrea, Beloit WI; West Side Veterans Administration Hospital, Chicago, IL, Cook County Hospital, Chicago, IL, 1989 – 1991.
- **Bachelor of Arts Degree**, University of Western Ontario, London, 1987.

PROFESSIONAL AFFILIATIONS

- Forensic Expert Witness Association
- American Society of Forensic Podiatry
- American Podiatric Medical Association
- Indiana Podiatric Medical Association
- International Association for Identification
- Indiana Division of the International Association for Identification
- American Bar Association
- Chartered Society of Forensic Sciences, Affiliate Member

HOSPITAL AND SURGICAL CENTER AFFILIATIONS

- St Mary Medical Center, Hobart, IN
- Methodist Hospitals, Merrillville, IN
- Pinnacle Hospital, Merrillville, IN
- Broadwest Surgical Center, Merrillville, IN