

Biographical Sketch

Provide the following information for each individual included in the Research & Related Senior/Key Person Profile (Expanded) Form.

NAME: SEAN KEENAN, MD	POSITION TITLE: ASSISTANT DIRECTOR, PREHOSPITAL, TRAUMA AND OPERATIONAL STRATEGY, COMBAT CENTER, CU ANSCHUTZ; CONSULTANT, JOINT TRAUMA SYSTEM
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EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training).

INSTITUTION AND LOCATION	DEGREE (IF APPLICABLE)	YEAR(S)	FIELD OF STUDY
USMA; West Point, NY	BS	1987-91	Chemistry
USUHS; Bethesda, MD	MD	1991-95	Medicine
Tripler AMC; Honolulu, HI	Transitional Internship	1995-96	Internship
SAUSHEC; San Antonio, TX	Residency	2000-03	EM Residency

RESEARCH AND PROFESSIONAL EXPERIENCE:

	<p>MILITARY CAREER EXPERIENCE: (retired from Active Duty, Rank: Colonel, September 30, 2018)</p>
1996 – 1999	Battalion Medical Officer/ Flight Surgeon , 1 st Battalion, 1 st Special Forces Group (Airborne); Torii Station, Okinawa, Japan
1999 – 2000	Flight Surgeon , McWethy Health Clinic; Fort Sam Houston, TX
2003 – 2005	Staff Physician/JMAU Medical Augmentee , Womack Army Medical Center/JSOC; Fort Bragg, NC
2005 – 2007	Battalion Medical Officer/ Flight Surgeon , 1 st Battalion, 3 rd Special Forces Group (Airborne); Fort Bragg, NC
2007 – 2009	Staff Physician, Department of Emergency Medicine , Evans Army Community Hospital; Fort Carson, CO
2007 – 2012	EMS Medical Director, Department of Emergency Medicine , Evans Army Community Hospital; Fort Carson, CO
2009 – 2012	Chief, Department of Emergency Medicine , Evans Army Community Hospital; Fort Carson, CO
2012 – 2015	Group Medical Officer/Flight Surgeon , 10 th Special Forces Group (Airborne); Fort Carson, CO
2015 – 2018	Command Surgeon , Special Operations Command Europe; Stuttgart, Germany
	<p>CURRENT PROFESSIONAL EXPERIENCE:</p>
2018 – PRES	Staff Emergency Physician , Evans Army Community Hospital; Fort Carson, CO
2019 – PRES	Joint Trauma System, Defense Health Agency (Combat Support) , Civilian Contract Consultant; San Antonio, TX
2019 – PRES	Ragged Edge Solutions, LLC , President, Research and Development/Chief Medical Officer; Kinston, NC
2020 – PRES	Assistant Director, Prehospital, Trauma and Operational Strategy , Center for COMBAT Research, University of Colorado, Anschutz Medical Campus; Aurora, CO
	<p>ACADEMIC CREDENTIALS:</p>
2018 – PRES	Adjunct Associate Professor of Military and Emergency Medicine Department of Military and Emergency Medicine

2020 – PRES	F. Edward Hébert School of Medicine Uniformed Services University of the Health Sciences Bethesda, MD Associate Clinical Professor of Emergency Medicine Department of Emergency Medicine University of Colorado, Anschutz Medical Campus Aurora, CO
2019 – 2029 2004 – 2024	BOARD CERTIFICATIONS: BOARD-CERTIFIED, EMERGENCY MEDICAL SERVICES (ABEM) DIPLOMATE, AMERICAN BOARD OF EMERGENCY MEDICINE Certification Number: 20030589 Original certification: 2004-2014 Recertification: 2014-2024
HONORS AND AWARDS	
2018	Legion of Merit (retirement award); Defense Meritorious Service Medal – Second Award (for service as Theater Special Operations Command (Europe) Surgeon, Stuttgart, Germany)
2016	Army Medical Department “A” Designator
2015	Meritorious Service Medal – Second Award (for service as Group Surgeon, 10 th SFG(A), Fort Carson, CO)
2014	Order of Military Medical Merit (O2M3)
2011	Joint Service Commendation Medal (for service as the Joint Special Operations Task Force – Philippines Surgeon)
2007	Army Commendation Medal – Fourth Award (for service as Battalion Surgeon, 1/3 SFG(A)); Bronze Star Medal – Third Award (for service with Task Force 31, Afghanistan)
2006	Army Commendation Medal with “V” (for Valor, Afghanistan, Sep 2006)
	Other: National Defense Service Medal (two awards), Iraq Campaign Medal, Afghanistan Campaign Medal, Global War on Terrorism Expeditionary Medal, Global War on Terrorism Service Medal, Humanitarian Service Medal (Cambodian Demining Project), Overseas Service Ribbon, Army Service Ribbon, Army Outstanding Volunteer Service Medal, Canadian Command-in-Chief Unit Medal, NATO Medal, Combat Medical Badge, Expert Field Medical Badge, US Navy Dive Medical Officer, US Army Senior Flight Surgeon, Parachutist Badge
OTHER EXPERIENCES AND PROFESSIONAL MEMBERSHIPS:	
2000 – PRES	American Academy of Emergency Medicine (Fellow, 2006) Uniformed Services Chapter of AAEM President: (Jul 2009- Jun 2011) Vice President (Jun 2008- Jun 2009) Army Representative (Jun 2007- May 2008)
2010 – PRES	Wilderness Medical Society, Member: 2010-present. (Fellow, 2015); Vice Chair, Operational Medicine Committee, Jul 2014-Jul 2016
2012 – PRES	Special Operations Medical Association, at-Large Board Member (May 2016-May 2020); Secretary/Treasurer (as of May 2020)

2015 – PRES	THOR Network (Traumatic Hemostasis and Oxygenation Research); Steering Committee member, January 2017-present
2018 – PRES	National Association of EMS Physicians
OTHER EXPERIENCES:	
2013 – PRES	SOMA Prolonged Field Care Working Group Founder and Coordinator , 2013-2017. Steering Committee 2013-present. Website: ProlongedFieldCare.org
2018 – PRES	Chief Medical Officer for Ragged Edge Solutions and <i>Mountain Path, International Mountain Path</i> , and <i>Dark Woods</i> Special Operations Forces medical exercises
2019 – PRES	Founder , International Committee for Austere Emergency Care
2020 – PRES	Chief Executive Officer/Trustee , Specialized Medical Standards, Inc. (nonprofit 501.c.3), 2020. A corporation established as a nonprofit to translate, standardize and maintain military best practices into civilian certification and educational products.

SELECTED, RELEVANT PUBLICATIONS IN PREVIOUS THREE YEARS (OUT OF 30 PUBLICATIONS):

1. Vasios W, Pamplin J, Powell D, Loos P, Riesberg J, **Keenan S**. Teleconsultation in Prolonged Field Care Position Paper. *Journal of Special Operations Medicine*. 2017; 17(3): 141-4.
2. Loos PE, Glassman E, Doerr D, Dail R, Pamplin JC, Powell D, Riesberg JC, **Keenan S**, Shackelford S. Documentation in Prolonged Field Care. *Journal of Special Operations Medicine*. 2018; 18(1): 126-32.
3. Fisher AD, Washburn G, Powell D, Callaway DW, Miles EA, Brown J, Dituro P, Baker JB, Christensen JB, Cunningham CW, Gurney J, Lopata J, Loos PE, Maitha J, Riesberg JC, Stockinger Z, Strandenes G, Spinella PC, Cap AP, **Keenan S**, Shackelford S. Damage Control Resuscitation in Prolonged Field Care. *Journal of Special Operations Medicine*. 2018; 18(3): 109-119.
4. Woolley T, Thompson P, Kirkman E, Reed R, Ausset S, Beckett A, Bjerkvig C, Cap AP, Coats T, Cohen M, Despasquale M, Dorlac W, Doughty H, Dutton R, Eastridge B, ^[1]Glassberg E, Hudson A, Jenkins D, **Keenan S**, Martinaud C, Miles E, Moore E, Nordmann G, Prat N, Rappold J, ^[1]Reade MD, Rees P, Rickard R, Schreiber M, Shackelford S, Eliassen HS, Smith J, Smith M, Spinella P, Strandenes G, Ward K, Watts S, White N, Williams S. Trauma Hemostasis and Oxygenation Research Network position paper on the role of hypotensive resuscitation as part of remote damage control resuscitation. *Journal Trauma Acute Care Surg*. 2018; 84(6, S1): S3-13.
5. Schauer SG, April MD, Naylor JF, Maddry JK, Keen DE, Cunningham CW, Becker TE, Walters T, **Keenan S**. A Descriptive Analysis of Casualties Evacuated from the Africa Area of Operations. *Afr J Emerg Med*. 2019;9(Suppl):S43-S46.
6. Dye C, **Keenan S**, Carius BM, Loos PE, Remley MA, Mendes B, Arnold JL, May I, Powell D, Tobin JM, Riesberg JC, Shackelford SA. Airway Management in Prolonged Field Care. *Journal of Special Operations Medicine*. 2020; 20(3): 141 - 156.
7. Rapp J, **Keenan S**, Taylor D, Rapp A, Turconi M, Maves R, Kavanaugh M, Makati D, Powell D, Loos PE, Sarkisian S, Sakhuja A, Mosely DS, Shackelford SA. Sepsis Management in Prolonged Field Care. *Journal of Special Operations Medicine*. 2020 Winter;20(4):27-39.
8. Shackelford S, del Junco D, Riesberg J, Powell D, Mazuchowski E, Kotwal R, Loos P, Montgomery H, Remley M, Gurney J, **Keenan S**. Case-control analysis of prehospital death and prolonged field care survival during recent US military combat operatios. *J Trauma Acute Care Surg*. 2021; 91(2, S2):S186-193.
9. Shackelford S, Gurney J, Taylor A, **Keenan S**, Corley J, Cunningham C, Drew B, Jensen S, Kotwal R, Montgomery H, Nance E, Remley M, Cap A. Joint Trauma System, Defense Committee on Trauma, and Armed Services Blood Program consensus statement on whole

blood. Transfusion. 2021; 61:S333-335.

CURRENT AND PENDING SUPPORT:

Mould-Millman (PI) – Role: Consultant; Funding Period: 2020 –2024; USAMRDC BA190049;
Funding Amount \$5,415,483

Title: *Epidemiology and outcomes of combat-relevant prolonged trauma care: a prospective multicenter prehospital pilot study in South Africa.*

Goal: The overall objective of this proposal is to conduct an epidemiologic prehospital trauma study in an austere, combat-relevant, foreign environment that innovatively addresses many of the military’s current scientific needs, and overcomes limitations experienced by prior U.S.-based prehospital trauma studies. Our primary hypothesis is that a sigmoidal relationship will exist between prehospital time and 7-day mortality. The inflexion point will represent a critical window of time for the patient to reach a trauma facility, after which 7-day mortality rates will accelerate from ‘low’ to ‘high’. This inflexion point will be at 2-hours for non- compressible, and 4-hours for compressible, injuries. Our secondary hypothesis is that there will be non-linear associations between time (from injury to reaching trauma center) with post-injury morbidity end-points.