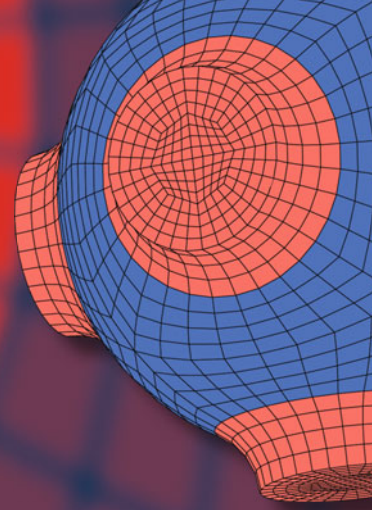


Advanced Structured Materials

Wolfgang H. Müller
Alfons Noe
Ferdinand Ferber *Editors*



New Achievements in Mechanics

A Tribute to Klaus Peter Herrmann

 Springer


Advanced Structured Materials

Volume 205

Series Editors

Andreas Öchsner, Faculty of Mechanical and Systems Engineering, Esslingen
University of Applied Sciences, Esslingen, Germany

Lucas F. M. da Silva, Department of Mechanical Engineering, Faculty of
Engineering, University of Porto, Porto, Portugal

Holm Altenbach , Faculty of Mechanical Engineering, Otto von Guericke
University Magdeburg, Magdeburg, Sachsen-Anhalt, Germany

Common engineering materials are reaching their limits in many applications, and new developments are required to meet the increasing demands on engineering materials. The performance of materials can be improved by combining different materials to achieve better properties than with a single constituent, or by shaping the material or constituents into a specific structure. The interaction between material and structure can occur at different length scales, such as the micro, meso, or macro scale, and offers potential applications in very different fields.

This book series addresses the fundamental relationships between materials and their structure on overall properties (e.g., mechanical, thermal, chemical, electrical, or magnetic properties, etc.). Experimental data and procedures are presented, as well as methods for modeling structures and materials using numerical and analytical approaches. In addition, the series shows how these materials engineering and design processes are implemented and how new technologies can be used to optimize materials and processes.

Advanced Structured Materials is indexed in Google Scholar and Scopus.

Wolfgang H. Müller · Alfons Noe ·
Ferdinand Ferber
Editors

New Achievements in Mechanics

A Tribute to Klaus Peter Herrmann

 Springer

Editors

Wolfgang H. Müller
Institute of Mechanics
Technical University of Berlin
Berlin, Germany

Ferdinand Ferber
Faculty of Mechanical Engineering
Paderborn University
Paderborn, Germany

Alfons Noe
Department of Mechanical Engineering
South Westphalia University of Applied
Sciences
Soest, Germany

ISSN 1869-8433

Advanced Structured Materials

ISBN 978-3-031-56131-3

<https://doi.org/10.1007/978-3-031-56132-0>

ISSN 1869-8441 (electronic)

ISBN 978-3-031-56132-0 (eBook)

© The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature Switzerland AG 2024

This work is subject to copyright. All rights are solely and exclusively licensed by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Paper in this product is recyclable.

*Dedicated to the memory of a creative
scientific spirit, Klaus Peter Herrmann*

Foreword



Klaus Peter Herrmann
(1937–2023)

Klaus Peter Herrmann was born in Königszelt, district of Scheidnitz, Lower Silesia (now Poland) on May 20, 1937. He passed away on March 14, 2023, in Paderborn (Germany). He retired from the Universität Paderborn in 2002, which he had joined as a Full Professor and Chair in 1977, and where he founded the LTM—Laboratorium für Technische Mechanik. His longstanding scientific activity in Fracture and Composite Mechanics—both experimental and theoretical—is well known in the Community of Mechanics, Mathematics, and Physics. In these fields, he enjoys a well-established reputation.

Throughout his work, eigenstresses in materials and their consequences in engineering were the paramount topic. This lifelong endeavor started with the defense of his Ph.D. thesis in 1963 under the supervision of Prof. Hieke at the Universität Halle-Wittenberg. It continues in his habilitation thesis—also accompanied by Prof. Hieke. During his time in Paderborn, more than 300 papers on the subject resulted and more than ten Ph.D. theses were supervised by him.

K. P. Herrmann was the editor of several monographs on failure of composites and a member of various scientific organizations, such as the Gesellschaft für Angewandte

Mathematik and Mechanik (GAMM) and the New York Academy of Science. He was a host to many international scientists for whom the LTM became a second home. He also organized the annual international workshop *AG Composite* at the Liborianum in Paderborn—an unforgotten event for every participant.

He will remain in the memories of his many friends and colleagues in the Scientific Community.

Berlin, Soest, Paderborn, Germany
January 2024

Wolfgang H. Müller
Alfons Noe
Ferdinand Ferber

Preface

Immediately after the unexpected death of Klaus Peter Herrmann, invitation letters for a special memorial volume were sent to his many friends and colleagues—scientists working in the fields of Continuum Mechanics (or more general Continuum Physics).

The nineteen papers compiled in this book are the result of this call. They can be categorized into

- General continuum physics
- Fracture and damage mechanics
- Composites
- Experimental mechanics

Of particular interest is an article on K. P. Herrmann's eventful life, which also contains a full list of his publications.

The editors would like to thank all contributors for their dedicated work. Moreover, we gratefully acknowledge Prof. Dr. hc. mult. Holm Altenbach and Dr. Christoph Baumann (Springer Publisher) for their support of the book project.

Berlin, Soest, Paderborn, Germany
January 2024

Wolfgang H. Müller
Alfons Noe
Ferdinand Ferber

Contents

The Scientific Work of K. P. Herrmann	1
Wolfgang H. Müller, Alfons Noe, and Ferdinand Ferber	
1 Beginnings and Scope of Scientific Work of K. P. Herrmann	1
2 Ph.D. Students	4
3 Books and Monographs	5
4 Peer-Reviewed Journals	5
5 Conference Proceedings	15
6 Reports and Miscellaneous	31
Closed-Form Analysis and Assessment of the Free-Edge Effect in Angle-Ply Laminates	33
Christopher Frey and Wilfried Becker	
1 Introduction	33
2 Failure Models	35
2.1 Finite Fracture Mechanics	35
2.2 Cohesive Zone Model	37
3 Layerwise Third-Order Model for the Free-Edge Effect	38
3.1 Underlying Boundary Value Problem	38
3.2 Closed-Form Approach	40
3.3 Numerical Reference Model	42
3.4 Displacement and Stress Solution	43
4 Onset of Delamination According to Finite Fracture Mechanics	46
4.1 Evaluation of the Coupled Criterion	47
4.2 Implementation of the Cohesive Zone Reference Model	49
4.3 Failure Load Predictions and Discussion	51
5 Conclusion	55
References	56
Modeling the Microstructure of Polycrystalline Sn–Ag–Cu Solders	61
Torsten Hauck, Yaxiong Chen, and Abhijit Dasgupta	
1 Introduction	61
2 SAC Grain Anisotropic Viscoplastic Constitutive Model	63

3 SAC Grain Boundary Isotropic Viscoplastic Constitutive Model 68

4 Synthesis of Multi-Grain Models 69

5 Multigrain Creep Simulation 70

6 Conclusion and Future Work 71

References 73

Thermomechanical Analysis of Sandwich Pipes with Graded Core 75

James C. Hastie, Maria Kashtalyan, and Igor A. Guz

1 Introduction 75

2 Problem Formulation 76

3 Finite Element Model 80

 3.1 Constraints, Loads and Boundary Conditions 80

 3.2 Model Validation 81

4 Results and Discussion 82

5 Conclusions 85

References 87

***M*-Integral and Energy-Release Rates: A Didactical Account 89**

Reinhold Kienzler, Anh Tay Nguyen, and Y. Eugene Pak

1 Introduction 89

2 Path—Independent Integrals and Material Tractions 90

3 Hollow Circular Cylinder 92

 3.1 General Solution 92

 3.2 External Loads at the Inner and Outer Boundaries 95

 3.3 Cylinder with Misfit Inclusion 97

 3.4 Interaction Problem 101

4 Calculation of the *M*-Integral 102

 4.1 Evaluation of the Path-Independent Integral 102

 4.2 Evaluation of the Virial of the Material Tractions 105

5 Self-similar Expansion 107

6 Conclusion 115

Appendix 116

References 119

Optimal Design from Noether’s Viewpoint 121

Vladimir Kobelev

1 Noether’s Theorems 121

 1.1 Noether’s Theorem in Physics 121

 1.2 Energy–Momentum Tensor in Elasticity 125

2 Noether Theorem in Shape Optimization 127

 2.1 Shape Variation and Optimization 127

 2.2 Shape Optimization for Linear Elastic Solids 128

 2.3 Shape Optimality from Noetherian Viewpoint 130

3 Local Variations and Topological Derivatives 132

 3.1 Topology Optimization of Structures 132

 3.2 Topological Optimality from Noetherian Viewpoint 133

4	Optimization for Anisotropic Elastic Medium	134
4.1	Anisotropic Elasticity, 4th Rank Tensor Notation	134
4.2	Optimization Problem	136
4.3	Rotational Optimality from Noetherian Viewpoint	138
5	Conclusions	139
	References	140
	Electrically Permeable Interface Crack with a Contact Zone in a 1D Piezoelectric Quasicrystal	143
	Volodymyr V. Loboda, Volodymyr B. Govorukha, and Alla E. Sheveleva	
1	Introduction	144
2	Formulation of the Problem and Constitutive Relations	145
3	Analytic Solution of the Problem	148
4	Analytical Expressions for the Components at the Interface	149
5	Contact Zone Model and Numerical Illustration	153
6	Conclusions	156
	References	157
	Positive Rates Predict Death Rates of Covid-19 Locally and Worldwide 13 Days Ahead	159
	Jürgen Mimkes and Rainer Janssen	
1	Introduction	159
2	Data	160
3	Positive Rate of Tests	161
4	<i>IFR</i> Mortality of Covid-19	162
5	Estimating the Total Number of Deaths	163
6	Estimating the Death Numbers in Germany 13 Days Ahead	164
7	The “thermometer” of the Covid-19-pandemic	165
8	Positive Rate and <i>IFR</i> mortality in different countries	165
9	Conclusions	166
	References	171
	Clouds on a Model Planet	173
	Ingo Müller	
1	Introduction	173
2	Standard Conditions	174
2.1	Standard Dry Atmosphere: Temperature, Pressure, Density and Moisture	174
2.2	Enthalpy	175
3	Clouds	176
3.1	Saturation	176
3.2	Dry Adiabatic Temperature Gradient	177
3.3	Cloud Base	178
3.4	On the Volume and the Thickness of Cumulus Clouds	180
4	Contributions to Energy Transfer	180
4.1	Solar and Planetary Radiations. Planck Distribution	180

- 4.2 Reflections 181
- 4.3 Solar Radiation 181
- 4.4 Radiation of Clouds and Ground 182
- 4.5 Convective Thermal Energy Flux 183
- 5 Balance Equations for Energies or Enthalpies 183
 - 5.1 Balance of Enthalpy for the Cloud Cover 183
 - 5.2 Balance of Energy of the Ground 184
- 6 Solutions 185
 - 6.1 Special Choices of Parameters 185
 - 6.2 Discussion 189
- References 189

**Simulation of Crack Propagation in Heterogeneous Materials
by a Fracture Phase Field 191**

Matthias Bohnen, Ralf Müller, and Dietmar Gross

- 1 Introduction 191
- 2 Linear Elastic Fracture Mechanics 192
 - 2.1 Two Dimensional Crack-Tip Fields 192
 - 2.2 Energy Release Rate 193
 - 2.3 Configurational Forces 194
- 3 Phase Field Model for Fracture 195
- 4 Fracture Toughness of Exemplary Materials 198
 - 4.1 Verification on Homogeneous Media 198
 - 4.2 Application to Heterogeneous Media 205
- 5 Summary and Conclusion 212
- References 213

**Momentum and Spin Balance in an Inertial Frame Obtained
by Using the Concept of Images 217**

Wolfgang H. Müller, Elena A. Ivanova, and Elena N. Vilchevskaya

- 1 Introductory Remarks 217
- 2 Literature Review on Frame-Invariance of Continuum Mechanics
Balances and Constitutive Equations 219
- 3 The Concept of Images and Its Application in Continuum Theory 224
 - 3.1 Basic Concepts and Definitions 224
 - 3.2 Euclidean Transformations and the Notion of Images 228
 - 3.3 Transformation of Velocities in Image Form 231
 - 3.4 Transformation of Accelerations in Image Form 234
 - 3.5 Transformation of Balance Equations 236
 - 3.6 The Pendulum Example 243
- 4 Conclusions 255
- 5 Appendix 255
 - 5.1 Auxiliary Formulae for the Rotation Tensors 255
 - 5.2 Transformation of the Substantial Time Derivative: Mass
Density 256

5.3 Transformation of Substantial Time Derivative: Specific Momentum	258
5.4 Transformation of the Substantial Time Derivative: Microangular Velocity	259
References	260
On Attempts to Interpret Maxwell’s Equations Mechanically—A Review	263
Wolfgang H. Müller, Elena A. Ivanova, and Elena N. Vilchevskaya	
1 Introductory Historical Remarks	263
2 The Æther as a Linear Elastic Medium	273
3 The Æther as a Micropolar Medium According to Zhilin	278
4 The Æther as a Geometrically Nonlinear Micropolar Medium According to Ivanova	284
5 Opinions About Form Invariance in Mechanics and Electrodynamics	292
6 Conclusions and Outlook	297
References	297
Warpage Reduction in Additively Manufactured Parts Based on Thermomechanical Modeling and a Novel Simulation Strategy for Laser Scanning	301
Benedikt Gladbach, Alfons Noe, and Tobias Rosenhövel	
1 Introduction	302
2 Test Setup and Material Properties	304
3 Thermomechanical Modeling for FEM Simulations	305
3.1 Thermal System, Heat Transfer and Laser Velocity	305
3.2 Residual Stresses, Deformations, Solid Constitutive Laws	312
3.3 Reasons for the One-Way-Thermomechanical Coupling	315
4 The Inherent Strain Concept for FEM Analyses	317
5 Scanning Strategies	319
5.1 Averaged Surface Displacement	320
5.2 Average Path Length	324
5.3 Proportionally Rotated Scan Paths	328
6 Conclusion	331
7 Appendix	332
References	338
Numerical Strategies to Study Compression Failure in Brittle Foams with 3D Realistic Microstructures	341
Vinit Vijay Deshpande and Romana Piat	
1 Introduction	341
2 Microstructure Reconstruction	343
3 Uniaxial Compression Failure Simulation	344
4 Biaxial Compression Failure Simulation	346
4.1 Neural Network Based Surrogate Model	348

5 Conclusion 352

References 352

A Surrogate Model for Numerical Evaluation of Elastic Properties of Particulate Composites with Rotationally Symmetric Particles 355

Pascal Alexander Happ, Igor Tsukrov, and Romana Piat

1 Introduction 355

2 Microstructure Modeling 358

 2.1 Particle Geometry Modeling 358

 2.2 Algorithms to Estimate the Elastic Properties of the Surrogate Layers and the Core 359

3 Numerical Studies 363

 3.1 Reference Area Element Containing a Single Particle 363

 3.2 Representative Volume Elements Containing Multiple Particles 367

4 Discussion 370

5 Conclusion 371

References 372

Additive Manufacturing and Experimental Analysis of a Beam with a 2D Triangular Substructure 375

Narges Poursangari, Aleksandr Morozov, and Wolfgang H. Müller

1 Introduction 376

2 Material and Methods 378

 2.1 CAD–Modelling 378

 2.2 Material 379

 2.3 3D Printing Methods 379

 2.4 Print Strategy 381

3 Test Setup 382

4 Results and Discussion 384

 4.1 Experimental Determination of Material Properties for Epoxy 391

5 Conclusions and Outlook 394

References 394

Mechanical Performance of MEAM Polymer Under Different Loading Conditions 395

Md. Niamul Islam, Konstantinos P. Baxevanakis, and Vadim V. Silberschmidt

1 Introduction 395

 1.1 Overview 395

 1.2 AM Processes 396

 1.3 Applications and Challenges of Additive Manufacturing 399

2 Quasi-static and Dynamic Mechanical Properties of MEAM Polymers 402

 2.1 Introduction to Material Extrusion Additive Manufactured Structures 402

- 2.2 Influence of Printing Parameters on Mechanical Properties 403
- 3 Nozzle Temperature 403
- 4 Specimen and Filament Orientation 404
- 5 Layer Height 406
 - 5.1 Mechanical Properties of MEAM Polymer Structures 409
- 6 Materials, Manufacturing Process and Methodologies 410
 - 6.1 Materials and Manufacturing Process 410
 - 6.2 Quasi-static Experiments 410
 - 6.3 Dynamic Impact Bending Experiment 411
- 7 Results and Discussion 414
 - 7.1 Tensile-Compressive Results 414
 - 7.2 3-Point Bending and Dynamic Impact Bending Results 417
- 8 Conclusions 418
- References 419
- An Overview of Methods for the Description of Rotations 425**
- A. Stankovic and W. H. Müller
 - 1 Introduction 425
 - 2 Definition of Reference Systems 426
 - 3 General Description of Rotation 428
 - 3.1 Active and Passive Rotations 430
 - 3.2 Attitude Matrices 432
 - 4 Euler Angles 433
 - 4.1 Intrinsic and Extrinsic Rotations 433
 - 4.2 Gimbal Lock 434
 - 5 Quaternions 435
 - 5.1 Rotations in Complex Numbers 436
 - 5.2 Rotations with Quaternions 437
 - 6 Conclusion 438
 - References 438
- An Experimental and Numerical Exploration
of Acceleration-Induced Cavitation in Soft Gel 441**
- Sam Aghayan, Mohammad Marvi-Mashhadi, and Kerstin Weinberg
 - 1 Introduction 442
 - 2 Experiments 443
 - 3 Analytical Computation of the Bubble Radius 444
 - 4 Finite Element Model of the Drop Test 446
 - 5 Finite Element Model of the Gel Sample 447
 - 6 Conclusion 449
 - References 450

The Scientific Work of K. P. Herrmann



Wolfgang H. Müller, Alfons Noe, and Ferdinand Ferber

Abstract In this article we present some information about the life and the scientific work of the late Prof. K. P. Herrmann. It contains various details regarding his scientific education, the academic institutions he was affiliated with, the principal direction of his research, his Ph.D. students, and a (hopefully) complete list of his scientific publications, which got lost after his retirement from the Universität Paderborn and which is recompiled here for the first time.

1 Beginnings and Scope of Scientific Work of K. P. Herrmann

Klaus Peter Herrmann (or K. P. Herrmann for short) was born on May 20, 1937 in Königszelt, district of Scheidnitz, Lower Silesia, now Poland (Fig. 1). After the invasion of Silesia by the Red Army in 1945 his family were forced to leave immediately. Finally, after a very stressful and dangerous escape through the Sudetenland (now Czechia) and Bavaria they managed to settle in Halle in East Germany, which was then under the occupation of the Soviets. In 1949 these passed on power to the German communists, who brought oppression and dictatorship of the people to perfection. Because he and his family showed a free and independent spirit they never could, nor ever would, agree to tyranny. Of particular importance to him was the right for free travel and exchange of scientific ideas. Indeed, he

W. H. Müller (✉)

Institute of Mechanics, Chair of Continuum Mechanics and Constitutive Theory, Technische Universität Berlin, Sekr. MS. 2, Einsteinufer 5, 10587 Berlin, Germany
e-mail: wolfgang.h.mueller@tu-berlin.de

A. Noe

Technische Mechanik, Fachhochschule Südwestfalen, Lübecker Ring 2, 59494 Soest, Germany
e-mail: noe.alfons@fh-swf.de

F. Ferber

Lehrstuhl für Technische Mechanik, Universität Paderborn, Pohlweg 47-49, 33098 Paderborn, Germany
e-mail: ferdinand.ferber@t-online.de

Fig. 1 Klaus Peter Herrmann 19–2023



started his scientific career at the Martin-Luther Universität Halle-Wittenberg at the Mathematisch-Naturwissenschaftliche Fakultät. By education and way of thinking he was a true physicist, with a strong affinity toward mechanics—in particular continuum mechanics—but open-minded to the needs of the engineering community. In fact his main field of research was in fracture mechanics, namely fracture due to thermal and other eigenstrains, with major engineering applications to fiber reinforced composites, which were of current interest at that time. The beginnings of his work are in linear elasticity, always accompanied by a strong touch of applied mathematics, and with a perspective into non-linear material behavior, specifically (visco-) plasticity.

This becomes evident from the title of his Ph.D. thesis (defense in 1963, publication in 1964) *Über ein elastisch-inelastisches Problem bei Vorhandensein von Eigenspannungen* (On an elastic-inelastic problem during the presence of eigenstresses) and his habilitation work in theoretical physics (1969) *Einige Beiträge zur Kontinuumstheorie der durch wohldefinierte Inkompatibilitätsverteilungen verursachten Eigenspannungen* (Some contributions of continuum theory on eigenstresses resulting from well-defined incompatibility distributions).

Of course, scientific thinking at the university was observed and controlled by the Stasi. They quickly realized that K. P. Herrmann was an “unsecure candidate.” Infamy reached a climax when they suggested that he should go to Russia for further studies. We would probably call such a sojourn a Postdoc now, but the term they used was *Aspirantur*, following Soviet terminology. Of course, the idea of the Stasi was to “adjust” K. P. Herrmann’s mind and to make him realize how wonderful communism really is. Naturally this generous offer he respectfully declined, and in

1970 he insisted on going to the Polish Academy of Science in Warsaw to the Chair of Witold Novacki instead. Poland was already then very different from the other satellite states of the Soviet Union. The Polish always thought of themselves as being special and independent, and had continued to fight for their freedom ever since the days of Kościuszko. It is therefore not surprising that in Warsaw, much different from East Germany, he found many like-minded people, who would stay his friends and scientific colleagues for the rest of life (see the publication list). Breathing a somewhat free air for the first time, and enviously realizing that the Polish colleagues were allowed to travel to the West, especially also to America, he and his wife, Dr. Rosel Herrmann, made up their mind to leave East Germany for good. This meant to give up a secure and prestigious position of a *Privatdozent* in Halle-Wittenberg in exchange for freedom. Therefore, in 1971 they secured an invitation from Heinz Parkus to give presentations at the Technical University of Vienna, booked return (!) flights and saw their luggage already being uploaded to the Austrian airplane, when they suddenly felt the arms of Polish security on their shoulders. What was missing was a stamp from the East German Embassy granting free passage. So the Poles called East German representatives, the luggage was unloaded, and he and his wife were first brought to East Berlin and then to the *Roter Ochse* prison in Halle, at that time still unchained.

At the *Roter Ochse* they both faced several months of pretrial detention under horrible sanitary conditions. Finally, in November of 1971 his wife was sentenced to “only” two years of prison (which made her “only” a delinquent in the East German eyes) and he, being considered as the leader of the whole operation, to two years and nine months of prison, which turned him into a criminal for East Germans. His wife was taken to the infamous penitentiary for women in Hoheneck and he to Cottbus Lager, this time in chains. Luckily the West German government started to negotiate through the sleazy, but effective East Berlin attorney Wolfgang Vogel for ransom release with the Stasi immediately. Moreover in 1972 the East German regime was showing good will in the interest of a smooth signing of the *Grundlagenvertrag*. So they officially declared a general pardon including political prisoners, because of the 23 year celebration of the founding of the “DDR.” This being a blessing in disguise, both Herrmanns were released after ca. one year of imprisonment.

They immediately went to West Germany to rejoin with family. In particular, his father, being old and thus expendable in the mind of communists, had lived there for several years by now. So K. P. Herrmann managed to resume his scientific career at the famous Universität Karlsruhe (now Karlsruhe Institute of Technology—KIT). There he joined the faculty at the Institut für Technische Mechanik und Festigkeitslehre in 1972 as a *Privatdozent*.

In 1973 he accomplished to change his *venia legendi* from theoretical physics to the field of mechanics and, after his appointment as *außerplanmässiger Professor* (extracurricular professor) in 1975, he took over the duties of the chair held by Prof. Lippmann on a deputy basis. In 1977 he was finally appointed to Full Professor and Chair at the newly founded Universität Paderborn. There he established his own laboratory and research group—the *Laboratorium für Technische Mechanik—LTM*.

It is fair to say that his origin as a theoretical physicist haunted him to the very end at the local engineering department. Unfortunately, (theoretical) physicists are perceived as “dangerous” and “strange” by engineers, which could be due to their strong mathematical knowledge most engineers shun and despise. But it is also fair to say that K. P. Herrmann got never tired to stress that “physicists are the salt of the Earth” and remained true to his beliefs. Moreover, it is doubtless a merit of K. P. Herrmann that in his laboratory versatile minds educated in mechanical engineering, applied mathematics and theoretical physics from Germany and many other countries met and benefited from each other for the advancement of science, as documented hereafter.

2 Ph.D. Students

K. P. Herrmann’s interest in thermal fracture manifests itself in the supervision of the theses of his thirteen Ph.D. students. Their work encompasses both, *theoretical* as well as *experimental* research in that field. Both branches were *equally* important to him:

1. Hans Peter Braun (1979) *Theoretische und experimentelle Untersuchungen zum Problem der quasistatischen Rissausbreitung in eigengespannten Zweikomponentenwerkstoffen.*
2. Hans Grebner (1983) *Bruchmechanische Untersuchungen zur Ausbreitung von Wärmespannungsrissen in spröden Mehrkomponentenmedien.*
3. Ferdinand Ferber (1986) *Bruchmechanische Analyse der Entstehung und Ausbreitung von Matrix- und Grenzflächenrissen in thermisch belasteten Faserverbundwerkstoffmodellen.*
4. Peter Pawliska (1988) *Finite-Element-Analyse rißbehafteter Modellsysteme von unidirektional verstärkten Faserverbundwerkstoffen unter Berücksichtigung des durch Wärmespannungen induzierten Plastifizierungs- und Kriechverhaltens des Matrixmaterials.*
5. Ming Dong (1993) *Untersuchungen zur Wärmespannungsrißausbreitung in zwei- und dreidimensionalen Modellkörpern von Schichtverbundwerkstoffen.*
6. Olaf Hinz (1993) Experimentelle und numerische Analyse von Rißspitzenspannungsfeldern mit Hilfe der digitalen Bildanalysetechnik.
7. Wolfgang Meiners (1994) *Über die Anwendung singulärer Integralgleichungen zur Untersuchung des Spannungszustandes in rissbehafteten diskontinuierlich inhomogenen Kontinua unter thermomechanischer Belastung.*
8. Alfons Noe (1994) *Zur dynamischen Ausbreitung gerader und gekrümmter Grenzflächenrisse in thermomechanisch belasteten Bimaterialien: Ein Beitrag zur Grenzflächenmechanik.*
9. Thorsten Hauck (1997) *Bruchmechanische Bewertung thermisch eigengespannter Grenzflächenrisse in elastoplastischen Bimaterialien.*

10. Bernd Potthast (1998) *Zur dynamischen Riausbreitung im drucksensiblen porosen elastoplastischen Festkrper bei Verwendung unterschiedlicher Materialmodelle.*
11. Klaus Linnenbrock (2000) *Zur Analyse thermisch induzierter dreidimensionaler Eigenspannungsrisse in rumlichen Verbundwerkstoffmodellen unter Verwendung numerischer und experimenteller Methoden.*
12. Van-Son Nguyen (2004) *Zur experimentellen Erfassung mechanischer Kenndaten thermo-mechanisch gealterter SMT-Lotwerkstoffe mit Hilfe des Small Punch Tests.*
13. Stefan Neumann (2004) *Anwendungen der diskreten Fourier-Transformation zur Entwicklung numerischer Algorithmen in der Mikromechanik.*

K. P. Herrmann's work in thermal fracture is reflected in two edited monographs and more than one hundred peer-reviewed and proceedings papers each in that field:

3 Books and Monographs

1. Herrmann, K. (1964). ber ein elastisch-inelastisches Problem bei Vorhandensein von Eigenspannungen, Martin-Luther Universitt Halle-Wittenberg, Math.-naturwiss. Fakultt, Dissertation, April 06, 1964.
2. Herrmann, K. (1969). Einige Beitrge zur Kontinuumstheorie der durch wohldefinierte Inkompatibilittsverteilungen verursachten Eigenspannungen, Martin-Luther Universitt Halle-Wittenberg, Math.-naturwiss. Fakultt, Habilitation Thesis, September 29, 1969.
3. Herrmann, K. P., Larsson, L. H. (Eds.). (1987). Fracture of Non-Metallic Materials: Proceedings of the 5th Advanced Seminar on Fracture Mechanics, Joint Research Centre, Ispra, Italy, 14–18 October 1985 in collaboration with the European Group on Fracture. Springer Science & Business Media.
4. Herrmann, K. P., Olesiak, Z. S. (Eds.). (1990). Thermal Effects in Fracture of Multiphase Materials: Proceedings of the Euromech Colloquium 255 October 31-November 2, 1989, Paderborn, FRG (Vol. 59). Springer Science & Business Media.
5. Vollertsen, F., Hahn, O., Herrmann, K. P., Meier, H. J. (Eds.). (2000). Endeigen-schaftsnahe Formgebung—Fertigung und Bauteilprfung. Shaker Verlag.

4 Peer-Reviewed Journals

1. Herrmann, K. (1962). Eine Nherungsentwicklung zur Berechnung des Spannungszustandes um den Randpunkt S1 der Trennlinie einer aus zwei Seg-

- menten zusammengesetzten unter Eigenspannungen stehenden kreisförmigen Glasscheibe. *Wiss. Z. Univ. Halle*, XI/4, 519–524.
2. Herrmann, K. (1965). Über ein elastisch-inelastisches Problem bei Vorhandensein von Eigenspannungen. *Wiss. Z. Univ. Halle*, XIV/5, 433–457.
 3. Herrmann, K. (1966). Geschlossene Lösung eines ebenen Temperaturspannungsproblems bei Vorliegen einer aus stetigen und unstetigen Anteilen zusammengesetzten Temperaturverteilung, *Zeitschrift für angewandte Mathematik und Mechanik*, 46(5), 281–287.
 4. Herrmann, K. (1967). Über “natürliche” und “erzwungene” Singularitäten eines ebenen wohldefinierten Eigenspannungszustandes und ihre Bedeutung für die Rißbildung im makroskopisch spröden amorphen Festkörper. *Wiss. Z. Univ. Halle*, XVI, 35.
 5. Hieke, M., Herrmann, K. (1968). Über ein ebenes Temperaturspannungsfeld von diskontinuierlichem Inhomogenitätstyp. *Zeitschrift für angewandte Mathematik und Mechanik*, 48(8), T141–T143.
 6. Hieke, M., Herrmann, K. (1968). Über ein ebenes inhomogenes Problem der Thermoelastizität, *Acta Mechanica*, 6, 42–55.
 7. Herrmann, K. P. (1970). Über Eigenspannungen im diskontinuierlich inhomogenen Festkörper. I. Konzentrische Lage der Teilgebiete. Schriftenreihe der DAW Berlin: Beiträge zur Spannungs- und Dehnungsanalyse, Heft VI, 21–39.
 8. Herrmann, K. P. (1970). Über Eigenspannungen im diskontinuierlich inhomogenen Festkörper. II. Exzentrische Lage der Teilgebiete. Schriftenreihe der DAW Berlin: Beiträge zur Spannungs- und Dehnungsanalyse, Heft VI, 41–52.
 9. Hieke, M., Herrmann, K. (1970). Ergänzende Bemerkung zur Arbeit “Über ein ebenes inhomogenes Problem der Thermoelastizität”. *Acta Mechanica*, 9, 151.
 10. Herrmann, K. P. (1970). Über Eigenspannungen im diskontinuierlich inhomogenen Festkörper. I. Konzentrische Lage der Teilgebiete. Schriftenreihe der DAW Berlin: Beiträge zur Spannungs- und Dehnungsanalyse, Heft VI, 21–39.
 11. Herrmann, K. (1974). A crack in a doubly connected thermoelastic solid. *Mechanics Research Communications* 1, 355–356.
 12. Herrmann, K. (1975). Wärmespannungsbruch in einem thermoelastischen Zweiphasenmedium. *Zeitschrift für angewandte Mathematik und Mechanik*, 55, T172–T173.
 13. Herrmann, K. (1975). Self-stress fracture in a thermoelastic two-phase medium. *Mechanics Research Communications* 2, 85–90.
 14. Herrmann, K., Kümmerling (1976). Gemischtes Randwertproblem für einen Griffith-Riß in einem zweifach zusammenhängenden Gebiet. *Zeitschrift für angewandte Mathematik und Mechanik*, 56, T114–T117.
 15. Herrmann, K., Kümmerling (1976). A crack-thermal stress problem in a doubly connected solid. *Archives of Mechanics* 28, 171–188.
 16. Braun, H., Herrmann, K. (1977). Numerische Lösung einer speziellen Klasse von ebenen Eigenspannungsproblemen. *Zeitschrift für angewandte Mathematik und Mechanik*, 57, T104–T106.

17. Herrmann, K., Fleck, A. (1977). Ein elastisch-plastisches Rißmodell für ein eigengespanntes Zweiphasenmedium bei Berücksichtigung von Verfestigung und Entfestigung in der Fließzone. *Mechanics Research Communications*, 4(6), 373–379.
18. Braun, H., Fleck, A., Herrmann, K. (1978). Finite element analysis of a quasistatic crack extension in a unit cell of a fibre-reinforced material. *International Journal of Fracture*, 14(1), R3–R6.
19. Herrmann, K., Mattheck, C. (1979). Thermal stresses in the unit cell of a fiber-reinforced material. *Journal of Thermal Stresses*, 2(1), 15–24.
20. Herrmann, K., Braun, H., Kemeny, P. (1979). Comparison of experimental and numerical investigations concerning thermal cracking of dissimilar materials. *International Journal of Fracture*, 15(5), R187–R190.
21. Herrmann, K., Braun, H. (1979). Crack analysis for a composite subjected to thermal loads. *Mekhanika Kompozitnykh Materialov*, (3), 470–479.
22. Braun, H., Herrmann, K. (1980). Quasistatische Rissausbreitung in der Einheitszelle eines eigengespannten faserverstärkten Verbundwerkstoff. *Zeitschrift für angewandte Mathematik und Mechanik*, 60(6), T105–T106.
23. Herrmann, K., Grebner, H. (1980). Über ein Randwertproblem der Thermoviskoelastizitätstheorie. *Zeitschrift für angewandte Mathematik und Mechanik*, 60, T120–T122.
24. Herrmann, K. P. (1981). Quasistatic thermal crack growth in the viscoelastic matrix material of a brittle fiber reinforced unit cell. *Mech. Res. Communications*, 8, 97–104.
25. Herrmann, K., Brauner, J., Falk, F. (1982). Eine Methode zur Behandlung von Verbundwerkstoffen als Gesamtsystem mit räumlich variablen elastischen Konstanten. *Zeitschrift für angewandte Mathematik und Mechanik*, 62, T109–T111.
26. Buchholz, F.-G., Herrmann, K. (1982). Zur Anwendbarkeit finiter Elemente mit höheren Verschiebungsansätzen für die numerische Berechnung bruchmechanischer Kennwerte. *Zeitschrift für angewandte Mathematik und Mechanik*, 62, T115–T118.
27. Herrmann, K. (1982). Gemischtes Randwertproblem für einen Wärmespannungsriß in einem Zweikomponentenmedium mit viskoelastischer Matrix. *Zeitschrift für angewandte Mathematik und Mechanik*, 62, T125–T128.
28. Herrmann, K., Grebner, H. (1982). Curved thermal crack growth in a bounded brittle two-phase solid. *International Journal of Fracture*, 19(3), R69–R74.
29. Herrmann, K., Braun, H. (1983). Quasistatic thermal crack growth in unidirectionally fiberreinforced composite materials. *Engng. Fract. Mech.*, 118, 975–996.
30. Herrmann, K., Mihovsky, I. N. (1983). Plastic behaviour of fibre-reinforced composites and fracture effects. *Engineering Transactions* 31, 165–177.
31. Herrmann, K., I. M. Mihovsky (1983). Elastic-plastic interaction of Dugdale type cracks and plastified matrix material in selfstressed fibre-reinforced composites. *Zeitschrift für angewandte Mathematik und Mechanik*, 63, T167–T169.

32. Herrmann, K. P., Mihovsky, I. M. (1984). Plastic zone size of Dugdale type cracks in a self-stressed two-phase medium with partially plastified matrix material. *Mechanika Teoretyczna i Stosowana*, 22(1–2), 25–29.
33. Herrmann, K. P., Grebner, H. (1984). Curved thermal crack growth in nonhomogeneous materials with different shaped external boundaries I. theoretical results. *Theoretical and applied fracture mechanics*, 2, 133–146.
34. Herrmann, K. P., Grebner, H. (1984). Curved thermal crack growth in nonhomogeneous materials with different shaped external boundaries, II. Experimental results, *Theoretical and Applied Fracture Mechanics* 2, 147–155.
35. Herrmann, K. P., Grebner, H. (1985). Quasistatic thermal crack extension in the interfaces of bounded self-stressed multiphase compounds. *Theoretical and applied fracture mechanics*, 4(2), 127–135.
36. Herrmann, K., Grebner, H. (1986). Energy release rates of straight interface cracks in self-stressed adhesive joints. *Zeitschrift für angewandte Mathematik und Mechanik*, 66(4), T141–T143.
37. Kaempf, B., Herrmann, K. (1986). Some remarks about the J-integral for thermo-elastic material. *International Journal of Fracture*, 30(1), R7–R10.
38. Herrmann, K., Pawliska, P. (1986). Finite element analysis of thermal crack growth in self-stressed fiber reinforced composites with partially plastified matrices. *International Journal of Fracture*, 31(1), R11–R16.
39. Herrmann, K. P., Mihovsky, I. (1987). On the applicability of the Dugdale crack model to fibre-reinforced composites. *Zeitschrift für angewandte Mathematik und Mechanik*, 67(4), T196–T197.
40. Ferber, F., Herrmann, K. (1988). Numerische und experimentelle Untersuchungen zur Ausbildung von Kombinationen aus Matrix- und Faser/Matrix-Grenzflächenrissen am Beispiel thermisch eigengespannter Faserverbundwerkstoffmodelle. *Zeitschrift für angewandte Mathematik und Mechanik*, 68(4), T178–T181.
41. Herrmann, K., Kaempf, B. (1988). Zum Rißverlauf in isotropen elastoplastischen Materialien. *Zeitschrift für angewandte Mathematik und Mechanik*, 68(4), T191–T193.
42. Herrmann, K. P., Mihovsky, I. M. (1988). Elastic-plastic transition in fibrous composites under mechanical and thermal loading conditions. *Zeitschrift für angewandte Mathematik und Mechanik*, 68(4), T193–T194.
43. Herrmann, K. P., Olesiak, Z. (1988). Thermodiffusive effects in a cracked fibrous composite. *Zeitschrift für angewandte Mathematik und Mechanik*, 68(4), T195–T196.
44. Herrmann, K., Meiners, W. (1988). Analytische Untersuchungen zum Problem gekrümmter Lastspannungsrisse in inhomogenen ebenen Körpern. *Zeitschrift für angewandte Mathematik und Mechanik*, 68(4), T219–T221.
45. Pawliska, P., Herrmann, K. (1988). Untersuchungen zum Kriechverhalten faserverstärkter Verbundmaterialien unter thermischer Belastung bei quasistatischer Rissausbreitung. *Zeitschrift für angewandte Mathematik und Mechanik*, 68(4), T238–T240.

46. Herrmann, K. P., Ferber, F. (1988). Elementary failure mechanisms in thermally stressed models of fiber reinforced composites. *Brittle matrix composites*, 2, 1–19.
47. Herrmann, K. P., Meiners, W. (1988). On a generalization of Irwin's formula concerning curvilinear interface cracks in brittle two-phase composite structures. *Engineering fracture mechanics*, 31(2), 249–254.
48. Herrmann, K., Dong, M. (1990). Bruchmechanische Untersuchungen zum Mixed-Mode Problem sowie zur Risswegvorhersage in Zweikomponentenmaterialien. *Zeitschrift für angewandte Mathematik und Mechanik*, 70(4), T292–T294.
49. Herrmann, K. P., Wang, Y. Q. (1990). Crack analysis of unit cells of fibre reinforced composites under axial and thermal loading. *Zeitschrift für angewandte Mathematik und Mechanik*, 70(4), T304–T306.
50. Herrmann, K. P., Ferber, F., Meiners, W., Noe, A. (1990). Strain energy release rates and related mixed-mode caustics at the tips of curvilinear interface cracks. *Fracture behaviour and design of materials and structures*, 2, 1099–1104.
51. Herrmann, K. P., Wang, Y. Q. (1991). Dugdale penny-shaped cracks in fibrous ductile matrix composites under axial and thermal loadings. *Engineering fracture mechanics*, 38(4–5), 295–305.
52. Herrmann, K. P. (1991). Kontinuumsmechanische Modellierung elementarer Schädigungsmechanismen in eigengespannten Verbundwerkstoffmodellen. *Zeitschrift für angewandte Mathematik und Mechanik*, 71(4), T33–T40.
53. Ferber, F., Herrmann, K. (1991). Bruchmechanische Untersuchungen an Matrix- und gekrümmten Grenzflächenrissen und numerische Simulation des Kaustikeneffektes. *Zeitschrift für angewandte Mathematik und Mechanik*, 71(4), T279–T282.
54. Dong, M., Hinz, O., Herrmann, K. (1991). Wärmespannungsrisse in Zweiphasenmedien unter inhomogener Temperaturverteilung. *Zeitschrift für angewandte Mathematik und Mechanik*, 71(4), T283–T287.
55. Noe, A., Meiners, W., Ferber, F., Herrmann, K. (1991). Zur geometrischen Form der Kaustiken gekrümmter Grenzflächenrisse. *Zeitschrift für angewandte Mathematik und Mechanik*, 71(4), T319–T322.
56. Herrmann, K. P., Noe, A. (1991). Calculation of energy release rates for interface cracks between dissimilar linear elastic isotropic materials. *International journal of fracture*, 50, R51–R58.
57. Herrmann, K. P., Wang, Y. Q. (1991). Dugdale penny-shaped cracks in fibrous ductile-matrix composites under axial and thermal loadings. *Engineering Fracture Mechanics* 38, 295–305.
58. Herrmann, K. P., Ferber, F. (1992). Numerical modelling of elementary failure mechanisms and associated caustics in two-phase composite structures. *Computers & Structures*, 44(1–2), 41–53.
59. Herrmann, K. P., Dong, M. (1992). Crack path prediction of thermal cracks arising in self-stressed two-phase brittle compounds. *Soviet materials science: A transl. of Fiziko-khimicheskaya mekhanika materialov/Academy of Sciences of the Ukrainian SSR*, 28(1), 74–79.

60. Herrmann, K. P., Noe, A. (1992). Analysis of quasistatic and dynamic interface crack extension by the method of caustics. *Engineering fracture mechanics*, 42(4), 573–588.
61. Herrmann, K. P., Noe, A. (1992). Analysis of complex singular stresses in composite mechanics by means of the method of caustics. *Composites: Fracture Mechanics and Technology*, 82–90.
62. Herrmann, K. P., Dong, M. (1992). Thermal cracking of two-phase composite structures under uniform and non-uniform temperature distributions. *International journal of solids and structures*, 29(14–15), 1789–1812.
63. Herrmann, K. P., Mihovsky, I. M. (1992). Approximate analytical investigation of the elastic-plastic behaviour of fibrous composites I. Thermal loading. *Annuaire de l'Université de Sofia, Livre 2-Mécanique*, 83, 5–20.
64. Herrmann, K. P., Mihovsky, I. M. (1992). Approximate analytical investigation of the elastic-plastic behaviour of fibrous composites I. External loading. *Annuaire de l'Université de Sofia, Livre 2-Mécanique*, 83, 21–35.
65. Herrmann, K. P., Noe, A. (1993). Analysis of dynamic mixed mode stress fields in bimaterials by the method of caustics. *Theoretical and applied fracture mechanics*, 19(1), 49–59.
66. Ferber, F., Hinz, O., Herrmann, K. (1993). Einsatz der Bildanalyse zur Isochromaten- und Kaustikensimulation. *Zeitschrift für angewandte Mathematik und Mechanik*, 73(4–5), T316–T320.
67. Dong, M., Herrmann, K. P. (1993). Bruchverhalten von Zweiphasenverbunden unter Wärmespannungsbelastung. *Zeitschrift für angewandte Mathematik und Mechanik*, 73(4–5), T455–T459.
68. Herrmann, K. P., Hauck, T. (1993). Finite Element Berechnungen makroskopischer thermischer Eigenspannungsfelder in metallischen Mehrkomponentenmedien unter Berücksichtigung vorhandener Defektstrukturen. *Zeitschrift für angewandte Mathematik und Mechanik*, 73, T459–T462.
69. Meiners, W., Herrmann, K. P. (1993). Untersuchung eines abgeknickten Rißsystems mit verallgemeinerten Singularitäten. *Zeitschrift für angewandte Mathematik und Mechanik*, 73, 465–468.
70. Noe, A., Herrmann, K. P. (1993). Dynamische Ausbreitung gekrümmter Grenzflächenrisse. *Zeitschrift für angewandte Mathematik und Mechanik*, 73, T469–T472.
71. Ferber, F., Herrmann, K. P. (1994). Crack extension in a single layer of a fibrous composite model-A numerical simulation. *Brittle Matrix Composites 4 (BMC 4)*, 190–199.
72. Herrmann, K. P., Noe, A. (1995). Dynamic interface crack propagation and related problems of caustics. *Archives of Mechanics*, 47(5), 915–956.
73. Ferber, F., Hinz, O., Herrmann, K. P. (1995). Determination of mixed-mode stress intensity factors by using the multiple-point methods of shadow optics and photoelasticity. *Photomécanique*, 95, 241–248.
74. Herrmann, K. P., Hauck, H. (1995). Grenzflächenrisse in elastoplastischen Mehrkomponentenmedien. *Zeitschrift für angewandte Mathematik und Mechanik*, 75, S227–S228.

75. Noe, A., Herrmann, K. P. (1995). Zur Grenzflächenmechanik bei schneller Rißausbreitung. *Zeitschrift für angewandte Mathematik und Mechanik*, 75, S237–S238.
76. Herrmann, K. P., Wang, R. (1995). Interaction of a crack with a circular inclusion in a thermally stressed material. *Zeitschrift für angewandte Mathematik und Mechanik*, 75(4), S295–S300.
77. Herrmann, K. P., Wesolowski, Z. (1995). Discontinuity waves in a periodic layered medium. *Zeitschrift für angewandte Mathematik und Mechanik*, 75, 699–706.
78. Herrmann, K. P., Wang, R. (1995). The stress field around a tensile crack interacting with a circular inclusion in a thermally stressed material. *Mechanics Research Communications* 22, 387–392.
79. Herrmann, K. P., Wang, R. (1995). Interaction of an antiplane shear crack with a transforming inclusion. *Engineering fracture mechanics*, 50(3), 361–368.
80. Herrmann, K. P., Potthast, B. (1996). Asymptotic crack tip fields for pressure-sensitive materials and dynamic crack growth under plane stress conditions. *International journal of fracture*, 74(3), R53–R61.
81. Herrmann, K. P., Noe, A., Dong, M. (1996). Interfacial crack growth in thermomechanically loaded bimaterial joints. *Composites Part A: Applied Science and Manufacturing*, 27(9), 813–820.
82. Ferber, F., Noe, A., Herrmann, K. P. (1996). Bestimmung bruchmechanischer Parameter mittels der digitalen Bildanalysetechnik und der schattenoptischen Kaustikenmethode. *ÖIAZ*, 141(5), 203–210.
83. Herrmann, K. P., Dong, M., Hauck, T. (1997). Modeling of thermal cracking in elastic and elastoplastic two-phase solids. *Journal of thermal stresses*, 20(8–9), 853–904.
84. Hauck, T., Herrmann, K. P. (1997). Equivalent-Domain-Integral Assessment of Thermally Loaded Interface Cracks. *Zeitschrift für angewandte Mathematik und Mechanik*, 77(1), S117–S118.
85. Potthast, B., Herrmann, K. P. (1997). Calculation of the asymptotic temperature field induced by dynamic crack growth in elastic-plastic materials. *Zeitschrift für angewandte Mathematik und Mechanik*, 77(1), S271–S272.
86. Herrmann, K. P. (1997). Rissausbreitungsvorgänge in thermomechanisch belasteten Zweikomponentenmedien: Analysis und Experiment. *Zeitschrift für angewandte Mathematik und Mechanik*, 77(3), 163–188.
87. Herrmann, K. P., Hauck, T. (1997). Numerical modelling of interface cracking in thermomechanically loaded elastoplastic bimaterials. *Computational mechanics*, 20(1–2), 41–45.
88. Noe, A., Herrmann, K. P. (1997). Elastodynamic parameters for dynamic interface fracture mechanics. *Acta mechanica*, 123, 203–226.
89. Ferber, F., Herrmann, K. P., Linnenbrock, K. (1998). Experimentelle Untersuchungen an Kompositmodellen mittels der digitalen Bildverarbeitung. *Zeitschrift für angewandte Mathematik und Mechanik*, 78, 373–374.

90. Herrmann, K. P., Loboda, V. V. (1998). The contact zone approach for the interface crack problem. *Zeitschrift für angewandte Mathematik und Mechanik*, 78(S2), 481–484.
91. Linnenbrock, K., Ferber, F., Herrmann, K. P. (1998). Numerische Analyse der automatisch erfaßten räumlichen Rißausbreitung in thermisch beanspruchten Verbundmodellen. *Zeitschrift für angewandte Mathematik und Mechanik*, 78, 597–598.
92. Potthast, B., Herrmann, K. P. (1998). Numerische Untersuchungen zur Ris-sausbreitung in drucksensiblen elastisch plastischen Materialien. *Zeitschrift für angewandte Mathematik und Mechanik*, 78(S2), 671–672.
93. Herrmann, K. P., Zhang, J. (1998). Strain energy release rate analysis of inter-laminar fracture induced by the 90°-ply cracking in composite laminates. *Zeitschrift für angewandte Mathematik und Mechanik*, 78(S2), 835–836.
94. Herrmann, K. P., Loboda, V. V. (1998). Special approach for the determination of fracture mechanical parameters at an interface crack tip. *Archive of Applied Mechanics*, 68, 227–236.
95. Potthast, B., Herrmann, K. P. (1998). Calculation of the asymptotic crack tip fields for a dynamic crack growth in ductile-porous solids. *ECF 12: Fractures from Defects*, 3, 1291–1296.
96. Zhang, J., Herrmann, K. P. (1998). Application of the laminate plate theory to the analysis of symmetric laminates containing a cracked mid-layer. *Computational materials science*, 13(1–3), 195–210.
97. Herrmann, K. P., Zhang, J. (1998). Application of the laminate plate theory to the analysis of symmetric laminates containing a cracked mid-layer. *Computational Materials Science* 13, 195–210.
98. Herrmann, K. P., Müller, W. H., Neumann, S. (1999). Linear and elastic-plastic fracture mechanics revisited by use of Fourier transforms—Theory and application. *Computational materials science*, 16(1–4), 186–196.
99. Herrmann, K. P., Loboda, V. V. (1999). On interface crack models with contact zones situated in an anisotropic bimaterial. *Archive of Applied Mechanics*, 69, 317–335.
100. Zhang, J., Herrmann, K. P. (1999). Stiffness degradation induced by multilayer intralaminar cracking in composite laminates. *Composites Part A: Applied Science and Manufacturing*, 30(5), 683–706.
101. Zhang, J., Fan, J., Herrmann, K. P. (1999). Delaminations induced by constrained transverse cracking in symmetric composite laminates. *International Journal of Solids and Structures*, 36(6), 813–846.
102. Junqian, Z., Herrmann, K. P. (1999). Stiffness degradation induced by multi-layer intralaminar cracking composite laminates. *Composites Part A: Applied science and manufacturing*, 30(5), 683–706.
103. Linnenbrock, K., Ferber, F., Herrmann, K. P. (1999). Bestimmung bruchmechanischer Kenngrößen bei der räumlichen Rißausbreitung in thermisch beanspruchten Verbundmodellen. *Zeitschrift für angewandte Mathematik und Mechanik*, 79, 513–514.

104. Herrmann, K. P., Loboda, V. V. (1999). On the two-parametric nature of the interface crack problem. *Zeitschrift für angewandte Mathematik und Mechanik*, 79, 515–516.
105. Herrmann, K. P., Zhang, J. (1999). Changes in thermoelastic properties arising from ply cracks in symmetric and unbalanced laminates. *Zeitschrift für angewandte Mathematik und Mechanik*, 79, 523–524.
106. Potthast, B., Herrmann, K. P. (2000). Asymptotic analysis for temperature fields induced by dynamic crack growth in pressure-sensitive materials. *International journal of fracture*, 106(1), 57–64.
107. Herrmann, K. P., Loboda, V. V. (2000). Fracture-mechanical assessment of electrically permeable interface cracks in piezoelectric bimetals by consideration of various contact zone models. *Archive of Applied Mechanics*, 70, 127–143.
108. Potthast, B., Herrmann, K. P. (2000). Asymptotic analysis for temperature fields induced by dynamic crack growth in pressure-sensitive materials. *International journal of fracture*, 106(1), 57–64.
109. Neumann, S., Herrmann, K. P., Müller, W. H. (2000). Computation of stresses and strains in heterogeneous bodies by use of the discrete Fourier transform. *Zeitschrift für angewandte Mathematik und Mechanik*, 80(S2), 403–404.
110. Herrmann, K. P., Müller, W. H., Nguyen, v. S. (2000). Determination of mechanical parameters of solder materials using the miniature measuring method “small punch test” and an appropriate FE-Simulation. *Zeitschrift für angewandte Mathematik und Mechanik*, 80(S2), 427–428.
111. Loboda, V. V., Herrmann, K. P. (2000). A contact zone approach for an interface crack in a piezoelectric anisotropic bimaterial. *Zeitschrift für angewandte Mathematik und Mechanik*, 80(S2), 479–480.
112. Linnenbrock, K., Ferber, F., Herrmann, K. P., Schnieders, J., Potente, H. (2000). Phenomenon of stress cracking at amorphous thermoplastics during hot plate welding. *Journal of Reinforced Plastics and Composites*, 21, 489–496.
113. Neumann, S., Herrmann, K. P., Müller, W. H. (2001). Fourier transforms—An alternative to finite elements for elastic-plastic stress-strain analyses of heterogeneous materials? *Acta mechanica*, 149, 149–160.
114. Herrmann, K. P., Müller, W. H., Neumann, S. (2001). The discrete Fourier transformation with applications to composites—an alternative to finite elements? *Zeitschrift für angewandte Mathematik und Mechanik*, 81, S295–S296.
115. Loboda, V. V., Herrmann, K. P. (2001). A contact zone approach for a crack between anisotropic materials under three-axial remote loading. *Zeitschrift für angewandte Mathematik und Mechanik*, 81, S373–S374.
116. Herrmann, K. P., Nguyen, v. S., Müller, W. H., Albrecht, H. J. (2001). Parameteridentifikation von SMT-Lotmaterialien mittels des Small Punch Testes. *Zeitschrift für angewandte Mathematik und Mechanik*, 81, S843–S844.
117. Herrmann, K. P., Linnenbrock, K., Ferber, F. (2001). Gekrümmte Rißausbreitung 3-dimensionaler Rißfronten in 2-Phasen Verbunden. *Zeitschrift für angewandte Mathematik und Mechanik*, 81, S857–S858.

118. Zhang, J., Fan, J., Herrmann, K. P. (2001). A theoretical model of matrix cracking in composite laminates under thermomechanical loading. *Acta Mecanica Solida Sinica* 14, 299–305.
119. Herrmann, K. P., Loboda, V. V. (2001). Contact zone models for an interface crack in a thermomechanically loaded anisotropic bimaterial. *Journal of thermal stresses*, 24(5), 479–506.
120. Potente, H., Schnieders, J., Herrmann, K. P., Ferber, F., Linnenbrock, K. (2001). Investigations concerning the development of inherent stresses during welding by using the drilled-hole method, as well as the finite element method. *Welding in the World*, 45(1/2), 9–17.
121. Junqian, Z., Herrmann, K. T., Jinghong, F. (2001). A theoretical model of matrix cracking in composite laminates under thermomechanical loading. *Acta Mechanica Solida Sinica-English Edition-*, 14(4), 299–305.
122. Herrmann, K. A. P., Loboda, V. V., Govorukha, V. B. (2001). On contact zone models for an electrically impermeable interface crack in a piezoelectric bimaterial. *International journal of fracture*, 111, 203–227.
123. Herrmann, K. P., Oshmyan, V. G. (2002). Theoretical study of formation of pores in elastic solids: particulate composites, rubber toughened polymers, crazing. *International journal of solids and structures*, 39(11), 3079–3104.
124. Neumann, S., Herrmann, K. P., Müller, W. H. (2002). Stress/strain computation in heterogeneous bodies with discrete Fourier transforms—different approaches. *Computational materials science*, 25(1–2), 151–158.
125. Herrmann, K. P., Linnenbrock, K. (2002). Three-dimensional thermal crack growth in self-stressed bimaterial joints: Analysis and experiment. *International journal of fracture*, 114, 133–151.
126. Herrmann, K. P., Oshmyan, V. G., Timan, S. A., Shamaev, M. Y. (2002). A structural model for high strains in polymer materials. *Vysokomolekuliarnye soedineniia. Serii C*, 44(9), 1677–1700.
127. Guz, I. A., Herrmann, K. P. (2003). On the lower bounds for critical loads under large deformations in non-linear hyperelastic composites with imperfect interlaminar adhesion. *European Journal of Mechanics-A/Solids*, 22(6), 837–849.
128. Herrmann, K. P., Loboda, V. V. (2003). Fracture mechanical assessment of interface cracks with contact zones in piezoelectric bimaterials under electromechanical loadings: I. Electrically permeable interface cracks. *International journal of solids and structures*, 40(16), 4191–4217.
129. Herrmann, K. P., Zhang, J., Fan, J. (2003). An energy-based statistical model for multiple fractures in composite laminates. *International Journal for Multiscale Computational Engineering*, 1(4), 327–347.
130. Herrmann, K. P., Loboda, V. V., Kharun, I. V. (2004). Interface crack with a contact zone in an isotropic bimaterial under thermomechanical loading. *Theoretical and applied fracture mechanics*, 42(3), 335–348.
131. Herrmann, K. P., Loboda, V. V., Komarov, A. V. (2004). Contact zone assessment for a fast growing interface crack in an anisotropic bimaterial. *Archive of Applied Mechanics*, 74, 118–129.