

# CONTENTS

## NOVEL DEVELOPMENTS

### Neural Signals

- 1 Kevin WARWICK  
**Control of a Robot Hand and Other Applications Using Neural Signals through an Implant**
- 5 Jay ALBERTS, Christopher ELDER, Michael OKUN, and Jerrold VITEK  
**Impact of Deep Brain Stimulation on Force Control in Parkinson's Disease**
- 9 Rachael D. SEIDLER, Douglas C. NOLL, and Prudhvi CHINTALAPATI  
**Neural Substrates Contributing to Generalization of Aiming Movements**
- 13 Hanneke I. VAN MIER and Steven E. PETERSEN  
**Changes in Brain Activations during Sequential Motor Learning**

## FUNDAMENTAL RESEARCH

### Fingers and Forces

- 18 Sara WINGES and Marco SANTELLO  
**Motor Unit Synchrony and Force Coordination during 5-Digit Grasping**
- 21 Mark L. LATASH, Jae kun SHIM, Fan GAO, and Vladimir M. ZATSIORSKY  
**Two Control Processes Associated with Multi-Digit Prehension**
- 25 Michael P. CALIGIURI, Gregory G BROWN, Sandra S. KINDERMANN, MJ MELOY, Lisa T. EYLER-ZORRILLA, and James B. LOHR  
**Functional Brain Asymmetries During Unimanual Visuomotor Tracking**
- 30 Thomas E. JERDE, John F. SOECHTING, and Martha FLANDERS  
**Analysis of Errors in ASL Fingerspelling**
- 34 Bouwien C.M. SMITS-ENGELSMAN, Yvonne WESTENBERG, Roeland R. SMITS, and Gerard P. Van GALEN  
**Developmental Trends in Signal-to-Noise Ratios in Bimanual Isometric Force Control**

### Repetitive Patterns

- 38 Natalia V. DOUNSKAIA, Caroline J. KETCHAM, and George E. STELMACH  
**Arm Geometry and Sinusoidal Joint Movements Predict The Bell-Shaped Velocity and the Two-Third Power Law**
- 42 Caroline J. KETCHAM, Natalia V. DOUNSKAIA, and George E. STELMACH  
**Control of Multijoint Drawing Movements: A Comparison of Young and Elderly Adults**
- 46 Sylvie ATHÈNES, Isabelle SALLAGOÏTY, Jean-Michel ALBARET, and Pier-Giorgio ZANONE  
**Universal Features of Handwriting : Towards a Non-linear Model**
- 50 Isabelle SALLAGOÏTY., Sylvie ATHÈNES, Pier-Giorgio ZANONE, and Jean-Michel ALBARET  
**Alterations of Graphic Production under Various Constraints Follow Principled Modifications in Underlying Pattern Dynamics**

### Feedback and Adaptation

- 55 Sima MISTRY and Jose L. CONTRERAS-VIDAL

**Learning Multiple Visuomotor Transformations: Adaptation and Context-Dependent Recall**

59 Florian A. KAGERER, Jin BO, Jose L. CONTRERAS-VIDAL, and Jane E. CLARK

**Visuomotor Adaptation in Children with Developmental Coordination Disorder**

**Models of Movement**

63 Daniel BULLOCK

**From Parallel Sequence Representations to Calligraphic Control**

67 Anna WOCH and Réjean PLAMONDON

**The Problem of Movement Primitives in the Context of the Kinematic Theory**

72 Jose L CONTRERAS-VIDAL and Shihua WEN

**Predicting Functional Activation (Synthetic PET) and Kinematics during Visuomotor Adaptation to Distorted Kinematic Environments using a Neural Network Model**

**Workspace**

77 Bouwien C. M. SMITS ENGELSMAN, Hilda BLOEM VAN DER WEL, and Jacques DUYSSENS

**The Impact of Workspace on Writing Performance: A Comparison between 6, 8 and 10 Year Old Children**

**Pen Strokes**

81 Moussa DJIOUA and Réjean PLAMONDON

**Relationship between Proportionality Law and Lognormality of a Coupled System Response**

86 Kazuhiko KOBAYASHI

**Estimate Kinematical Parameters of Finger and Wrist During Handwriting Movements by means of Short Line Segments Drawing**

90 James G. PHILLIPS, Tom J. TRIGGS, Roger STEVENSON, and James W. MEEHAN

**Independence of Perception and Action during Drawing?**

95 Robert R.A. VAN DOORN, Hanneke I. VAN MIER, Pieter J.A. UNEMA, and Koen J.M. JANSSEN

**The Effect of Instructed Dwell Time on the Performance of Successive Aimed Pen Movements**

99 Hans-Leo TEULINGS and Arend W.A. VAN GEMMERT

**Goal-Directed Movements in Menu Selection in Computer-User Interfaces**

103 Diana H. ROMERO and Hans-Leo TEULINGS

**Submovement Analysis in Goal-Directed Movements**

107 Hans-Leo TEULINGS and Diana ROMERO

**Submovement Analysis in Learning Cursive Handwriting or Block Print**

111 Jules G. BLOEMSAAT, Gerard P. VAN GALEN, and Ruud G.J. MEULENBROEK

**Activation Patterns in Forearm and Neck Muscles as a Function of Movement Speed and Memory Load**

115 Joel REITHLER, Hanneke VAN MIER, and Gerard VAN BREUKELLEN

**Effects of Mental and Physical Practice in a Sequential Motor Learning Task**

## MEDICAL APPLICATIONS

### Disorders and Drugs I

- 119 Charles H. ADLER, Arend W. A. VAN GEMMERT, Hans-Leo TEULINGS, and George E. STELMACH  
**A Quantitative Analysis of the Production of the Archimedes Spiral in Parkinson's disease patients and Controls**
- 123 Brandon ROHRER and Neville HOGAN  
**Submovement Overlap as a Measure of Movement Smoothness**
- 127 Sam CHINDARO, Richard M. GUEST, Michael C. FAIRHURST, and Jonathan M. POTTER  
**Assessing Visuo-Spatial Neglect through Feature Selection and Combination from Geometric Shape Drawing Performance and Sequence Analysis**
- 131 Klaus W. LANGE, Steffen ASCHENBRENNER, Tobias MEISSNER, and Oliver TUCHA  
**Nicotine and Handwriting**
- 136 Oliver TUCHA, Lara MECKLINGER, Rainer LAUFKÖTTER, Geraldine M. PAUL, Helmfried E. KLEIN, and Klaus W. LANGE  
**Effects of Stimulant Medication on Handwriting in Children and Adults with Attention Deficit Hyperactivity Disorder**

### Disorders and Drugs II

- 141 Gregory J. IMLAY and George E. STELMACH  
**Targeted Isometric Index Finger Force Production**
- 145 Oliver TUCHA, Lara MECKLINGER, Geraldine M. PAUL, and Christian SMELY  
**Handwriting in a Patient with a Mass Lesion of the Left Frontal Lobe**
- 150 Klaus W. LANGE, Oliver TUCHA, Astrid REITER, Lara MECKLINGER, Silke BIRZER, Gesine L. ALDERS, Heino SARTOR, and Marcus NAUMANN  
**Disturbances of Handwriting Fluency in Parkinson's Disease**

## EDUCATION & DEVELOPMENT

### Children and Learning

- 155 Stephen GROSSBERG  
**How Do Children Learn to Write? Modeling the link from brain dynamics to complex sensory-motor control**
- 159 Eugene A.A. RAMECKERS, Bouwien C.M. SMITS ENGELSMAN, and Jacques DUYSSENS  
**Influence of Visual Feedback on Force Generation and Force Control in Children with Spastic Hemiplegia during Isometric Manual Tasks**
- 164 Anneloes J.A.A.M. OVERVELDE, Bouwien C.M. SMITS ENGELSMAN, Mireille THE, and Wouter HULSTIJN  
**Implicit and Explicit Learning in Children with Learning Disabilities: A Comparison between Children scoring Low on the Perceptual Organization factor of the WISC-R and Children scoring Low on the Freedom From Distractibility factor**
- 169 Sara ROSENBLUM, Shula PARUSH, Liora EPSZTEIN, and Patrice L. WEISS  
**Process Versus Product Evaluation of Poor Handwriting among Children with Developmental Dysgraphia and ADHD**

### Computer in Education

- 174 I. ZAAROUR, L. HEUTTE, B. ETER, J. LABICHE, D. MELLIER, P. LERAY, and M. ZOAETER  
**A Probabilistic Modeling of the Writing Strategies Evolution for Pupils in Primary Education**
- 178 I. ZAAROUR, Ph. LERAY, L. HEUTTE, B. ETER, J. LABICHE, and D. MELLIER

**A Bayesian Network Model for Discovering Handwriting Strategies of Primary School Children**

182 Oliver TUCHA, Sigrun RICHTER, and Klaus W. LANGE

**Intention to Write and Handwriting in Children and Young Adults**

187 Martin A. E. VAN HUYGEVOORT, Ludo VERHOEVEN, and Anna M. T. BOSMAN

**Differences between Children's Handwritten Stories and Those Typed on a Computer**

**COMPUTER INTERACTION**

**Handwriting Recognition**

192 Moumita GHOSH and Ranadhir GHOSH

**Offline Handwriting Recognition using Evolutionary Neural Learning Algorithm Based on Rule based Over Segmented Data Points**

196 Simon GUENTER and Horst BUNKE

**Off-line Cursive Handwriting Recognition - On the Influence of Training Set and Vocabulary Size in Multiple Classifier Systems**

200 Tamas VARGA and Horst BUNKE

**Effects of Training Set Expansion in Handwriting Recognition Using Synthetic Data**

204 Cinthia O.A. FREITAS, Flávio BORTOLOZZI, and Robert SABOURIN

**Study of Perceptual Similarity between Different Lexicons**

**Mouse or Touch Panel**

208 Roger STEVENSON, James G. PHILLIPS, and Tom J. TRIGGS

**Graphics Tablets as Cursor Control Devices II**

**Segments and Shapes**

212 Claudio DE STEFANO, Gianluca GUADAGNO, and Angelo MARCELLI

**A Decomposition Method for Cursive Handwriting based on Multi-Scale Representation**

216 Keisuke MOCHIDA and Masaki NAGAKAWA

**Separating Drawings, Formula and Text from Free Handwriting**

**Signature Verification**

220 Julio MARTINEZ-R and Rogelio ALCANTARA-S.

**Optimal prototype functions of features for on-line signature verification**

224 Katrin FRANKE, Lambert SCHOMAKER, and Wolfgang PENK

**Online Pen Input and Procedures for Computer Assisted Forensic Handwriting Examination**

228 Meenakshi K. KALERA, Bin ZHANG and Sargur N. SRIHARI

**Off-line Signature Verification And Identification Using Distance Statistics**

**On- and Offline Handwriting**

233 John FEMIANI, Jeremy ROWE, and Anshuman RAZDAN

**3D Analysis of Offline Signatures**

237 Giovanni D'ANDRIA, Claudio DE STEFANO, Raffaella FOGLIA, and Angelo MARCELLI

**An Algorithm for Handwriting Strokes Reordering**

241 Alan HARVEY, Chandra WELIWITAGE, and Andrew JENNINGS

**Word Spotting Using Evolutionary Search in Cursive Script**

245 Chandra WELIWITAGE, Alan HARVEY, and Andrew JENNINGS

**Use of Hough Transform for Handwritten Character Slant Detection**

249 Jin-Young HA, Mina PARK, and Alain BIEM

**A Study of Various Model Selection Criteria for HMM Topology Optimization**

## FORENSIC APPLICATIONS

### Classical Forensics

- 253 Marvin L. SIMNER, Angelo MARCELLI, Sergey ABLAMEYKO, Klaus W. LANGE, and Jairo ROCHA, and Oliver TUCHA  
**A Comparison of Arabic Numeral Allographs Written by Adults from English Speaking vs. Non-English Speaking Countries**
- 257 Jodi C. SITA, Doug ROGERS, and Bryan FOUND  
**A Model using Complexity Classification, Spatial Score and Line Quality for Forensic Signature Comparison**

### Automatic Writer Recognition

- 261 Zhixin SHI, Bin ZHANG, Catalin TOMAI, and Sargur N. SRIHARI  
**Recognition-based System for Handwriting Verification and Identification**
- 266 Ajay SHEKHAWAT, Sargur N. SRIHARI, and Subir PARULEKAR  
**Individuality Studies for Online Handwriting**
- 270 Bin ZHANG and Sargur N. SRIHARI  
**Handwriting Identification Using Multi-scale Features**
- 274 A. BENSEFIA, T. PAQUET, and L. HEUTTE  
**Grapheme Based Writer Verification**

### Computers in Forensics I

- 278 Sargur N. SRIHARI and Graham LEEDHAM  
**A Survey of Computer Methods in Forensic Document Examination**
- 282 Merijn VAN ERP, Louis G. VUURPIJL, Katrin FRANKE, and Lambert R.B. SCHOMAKER  
**The WANDA Measurement Tool for Forensic Document Examination**
- 286 Katsuhiko UEDA, Ken-ichi MATSUO, and Yoshikazu NAKAMURA  
**A Computer-Based System to Support Forensic Analysis of Japanese Handwriting**
- 291 Graham LEEDHAM, Vladimir PERVOUCHINE, WeiKei TAN and Arun JACOB  
**Automatic Quantitative Letter Level Extraction of Features used by Document Examiners**

### Computers in Forensics II

- 295 Katrin FRANKE and Lambert SCHOMAKER  
**Pen Orientation Characteristics of Online Handwritten Signatures**
- 299 Jodi C. SITA, Doug ROGERS, and Bryan FOUND  
**Spatial Comparison of Questioned to Specimen Signatures using Matrix Analysis Software**
- 304 Sumit CHACHRA, Himanshu SAHANI, Vinod KUMAR, and H.K. VERMA  
**Adaptive Segmentation of On-Line Signatures**
- 308 Matthieu WIROTIUS and Nicole VINCENT  
**Stroke inner structure invariance in handwriting**
- 312 Hung-Chun CHEN, Sung-Hyuk CHA, Yi-Min CHEE, and Charles C. TAPPERT  
**The Detection of Forged Handwriting Using a Fractal Number Estimate of Wrinkliness**
- 316 Graham LEEDHAM, Vladimir PERVOUCHINE, WeiKei TAN, and Arun JACOB  
**Assessment of the Stability and Usefulness of some Handwriting Features used by Document Examiners to Identify Authorship**
- 320 A. BENSEFIA, T. PAQUET, and L. HEUTTE  
**Information Retrieval based Writer Identification**
- 324 Takeshi FURUKAWA, Kazuhiko KOBAYASHI, and Yoko SEKI  
**The Reconstruction of Handwriting of Japanese Kana Characters using Velocity Profiles of Pen-Tip**

