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McGill

Centre for

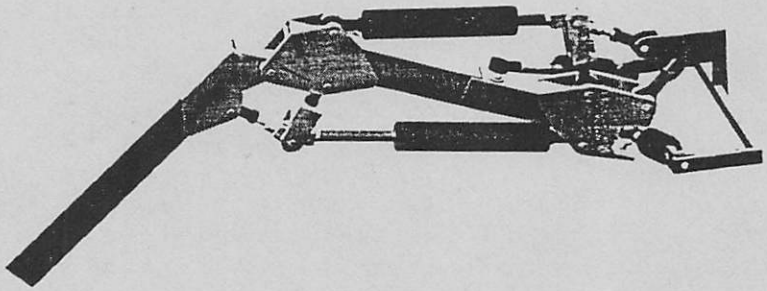
Intelligent Machines

Newsletter

News from Duisburg

For those of you who do not know where, or what, Duisburg is, here's a crash introduction: Duisburg is an old German, formerly Hanseatic city located at the Rhine, about 30 km north of Düsseldorf, or 60 km north of Cologne, or 80 km north of Bonn, or 5400 km east of Montreal, whatever your preferred point of reference is. It forms the far west end of the Ruhrgebiet, Europe's largest industrial conurbation comprising more than ten cities and 5 million people. Duisburg's history is shaped by the region's gigantic deposits of hard coal, and its derived product, the coke (not to be confused with a drink of similar colour and reduced availability in Quebec). These made it attractive for men like Krupp, Thyssen and Mannesmann, who were to become Europe's legendary steel tycoons, to build huge steel factories in or around Duisburg. Duisburg's favourable location at the confluence of the Ruhr and Rhine rivers further boosted Duisburg's economic role, making it the centre for transshipment operations of the complete Ruhr region. During the steel crises of the sixties and seventies, many steel factories and coal mines in the area had to be closed, and Duisburg, like many other Ruhr cities, lost much of its economic power. After undergoing a period of structural change, during the eighties, Duisburg emerged again as a strong competitor in the European market, attracting investors from many technological lines, such as car suppliers, chemical and semiconductor industries, etc. Duisburg still is hometown to many superlatives. For example, it hosts the world's largest inland port, with a yearly handling of fifty million metric tons, as well as Germany's largest and (apologies to our Bavarian friends) best brewery, the Königs-Brauerei.

At the Institute of Mechatronics of the Gerhard Mercator University of Duisburg, chaired by Prof. M. Hiller, one of the research fields is the analysis and design of a novel anthropomorphic leg for legged ambulatory devices. This system consists of a three-dof thigh coupled by means of a single-dof joint to the lower leg, or tibia, all four degrees of freedom being actuated by hydraulic cylinders. The purpose of this leg mechanism is to mimic human leg motion, a feature of paramount importance when the legged robotic device at hand needs to be operated in master-slave mode. This situation arises typically in extremely unstructured operating environments. In this respect, the joints are designed such that the thigh is able to perform flexion/extension motions, i.e., rotations about the transverse hip axis, of 180°, while the abduction and adduction rotations, i.e., the rotations about the sagittal axis, are restricted to ±20°. By virtue of this particular design, the actuation of the four rotations is decoupled in the reference configuration. While this is not true for a general deflected configuration, the particular design still allows one to resolve the kinematic equations in recursive, i.e., closed form, making real-time computer control feasible. On a long-term basis, the leg mechanism is targeted towards becoming part of the roboTRAC vehicle, a combined legged-and-wheeled robot jointly devised by Prof. G. Schweitzer at the ETH (Federal Institute of Technology) of Zurich and Prof. M. Hiller.



The design of this mechanism was performed using the object-oriented multibody modelling package MOBILE. MOBILE is a C++-library of executable modules that allows the user to model a

mechanical system as an assembly of simpler building units, which can subsequently be used as a module for more sophisticated applications, such as control, optimization, etc. Integrated into the library is the capability to produce smooth three-dimensional shaded renderings of mechanism motion through mouse-operated user feedback. The library runs on SGI-workstations featuring Inventor 2.0 and is currently installed on Deepblue.

Submitted by Andres Kecskemethy

Access to Labs

I have been asked to clarify the CIM policy for access to the labs. All the CIM computers and equipment are available for use by all CIM students. Regarding rooms 444 and 438 however, where the lab also serves as office space and therefore contains personal belongings, the combination will not be made public. Any student who does not normally have access to those rooms but who needs to use the computers there, may make arrangements with someone in that lab to do so. You should not encounter any problems, I have spoken to the occupants of those rooms and they have no objections to complying with this policy.

In case you didn't read the e-mail message:
We have been informed that the lab doors are often left open during the weekends and evenings, and that students from other departments are taking paper out of our printers. CIM students have seen this happen on more than one occasion. Not only are we losing money supporting other departments' paper needs, but I don't think I have to remind you of the expensive equipment and even personal belongings that can be stolen from our labs. From now on, we will be enforcing the policy that all lab and office doors remain closed AT ALL TIMES, including during the day. We need your help! We implore you to become more protective of your (CIM) property by enforcing this policy. If you see a door has been left open, please close it. If you see someone you don't recognize using CIM equipment or taking CIM paper or even just hanging around (especially on weekends and evenings), please ask them who they are. If you doubt the answer they give you or if you notice anything unusual, please let me or Jan know. We need your cooperation and help in keeping CIM's expenses reasonable so we can continue to meet your needs. Last year CIM spent over $8000 for paper, the costs are not trivial. We will all benefit by your increased vigilance. Thanks very much for your help!

Spring holidays

McGill University, and CIM, will be closed Friday, April 14 and Monday, April 17.

NEWS AND EVENTS

Hats off to...

☞**Professor Pierre Belanger** who was recently appointed Vice-Principal (Research) and Dean of the Faculty of Graduate Studies, effective June 1. Prof. Belanger will continue his research at CIM. Prof. Belanger served as Dean of Engineering from 1984 to 1994 and Chair of the Electrical Engineering Dept. from 1978 to 1984. He also taught at MIT before joining McGill's Dept. of Electrical Engineering. Principal Shapiro said Prof. Belanger will 'bring to the position considerable expertise in administration and research, as well as broad experience with industry and the granting agencies'. Congratulations, Pierre!! All the best!

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☞**Tal Arbel**, who submitted her master's thesis entitled: 'Recognizing Volumetric Objects in the Presence of Uncertainty'. She has already started a PhD under the supervision of Prof. Ferrie. She says she'll take everyone out for a beer when she hears the final approval from the externals... Tal also said, 'Thanks to all my friends (and supervisor) for their support and encouragement'.

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☞**Mei Zhang** submitted her Masters thesis on March 22. She is presently working at CAE Electronics on flight simulation. She is looking

forward to a field trip to China this summer. Mei said, 'I will remember the days at CIM. Best wishes to you all.' Best wishes to you, Mei!

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☞The EEGSS organized a formal seminar in honor of **Prof. George Zames** who won the prestigious 1995 Killam Prize (see March newsletter for details of the prize). Prof. Zames gave two seminars on March 28 which were received with so much success the seminars had to be moved to a larger room!

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☞If you were watching Pulse News on March 20, you may have recognized the familiar face of **Julie Payette**, who is presently working on her PhD at CIM. Julie was featured in a segment entitled: 'A Day in the Life of a Canadian Astronaut'. Julie ended her interview with a thought for all of us, 'We should take care of our planet as well as we take care of the shuttle'. Bravo, Julie!

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Welcome to:

☞ **Simon Lacroix**, who is from LAAS (Toulouse, France), where he spent the last 4 years. His thesis subject was : 'Perception and Navigation Strategies for Autonomous Navigation on a Natural Terrain', and the work actually consisted of two main parts: natural environment modelling (from 3D data), and 'navigation strategies', i.e. selection of a subgoal to reach and of the next perception task to execute.

He will be working at CIM as a post-doc with Prof. Greg Dudek on something related to environment modelling, perception planning, or exploration strategies (to be more clearly defined). Of his interests, he says, "I think I just discovered a 'passion' for Quebec and especially Montreal".

☞**Luc Joly**, who is from France. He began a PhD in October 93 with the Robotics and Teleoperation Department of the French Commision on Atomic Energy. His research work deals with advanced control for teleoperation. He'll be at CIM for 16 months as an 'invited scholar' under Prof. Hayward's supervision. Welcome, Luc!

Good bye to:

☞**Wolfgang Seyffert**, who left CIM in April. He will be working for a company in Liechtenstein, starting May 1. It is a tiny principality situated between Austria and Switzerland, so he'll be moving to either of those two countries. From what he has seen of the region, he says it has very beautiful scenery with lots of mountains. He may change his hobbies to mountain climbing or paragliding instead of skydiving. Snow conditions may be similar to Quebec but he says, 'I am still a lousy skier! Thanks for everybody's assistance and I hope to see you again some time.' All the best, Wolfgang!

Articles & ideas are welcome. Please send them by e-mail to the editor. Deadline for publication is the 7th of every month.

Editor: Janet Burghardt (e-mail: jmb@cim.mcgill.ca)

Associate Editors: Paul Mackenzie
Kathleen VanderNoot

Wine and Cheese Party...

As you know, Prof. Laeeque Daneshmend is leaving CIM at the end of April to join Queen's University (see February newsletter for details). We will be having a wine and cheese party in his honor on April 11 at 3 PM in room 437. We invite you all to join us on the 11th in wishing Prof. Daneshmend all the best. See you then!

CIM TOP TEN

Top 10 CIM (Mis)Quotes...

⑩ "Hey man, ABS, eh? ABS!!" --- Jonas August, extolling the wonders of modern anti-lock braking systems to passing motorists.

⑨ "Huh? What'd you say? Pardon?" --- Anyone in room 416 while the SARCOS robot's hydraulic pump is running.

⑧ "Things are kinda slow around here. I think I need to be assigned more work." --- Marc Bolduc.

❼ "Who the &%$# keeps stealing our $&#%*@! lab chairs?!" --- Danny Grant.

❻ "Whadda-ya mean the coffee machine's broken? There's no coffee? How am I supposed to do my research? How do you expect me to... to...ahhh... hhhrrr... ooohhh..." --- James Elder, just before passing out.

❺ "Here, why don't you use my MacIntosh?" --- Janet Burghardt.

❹ "...and for this holonomic contrivance we can facilitate active binocular stereo under the framework of unilocular infrastructure with this 670-nanometre wavelength optical focus, while discharging computing responsibility to the on-board 66MHz DX2 VLbus task controller." --- Professor Ferrie, outlining the big picture to a hapless group of visiting high school students.

❸ "Attention all bookshelves, tables and anyone else! Get outta my way, I'm comin' through!!" --- InVader, the no-nonsense muscle-bound Nomad 200 mobile robot.

❷ "Don't even THINK about talking to me while I'm programming..." --- Tal Arbel.

❶ "I'm cuckoo for COCOLOG!" --- Professor Caines.

Submitted by Paul Mackenzie

Closing comments from Paul Mackenzie

☞Congratulations to CIM-dude **Oliver Astley,** who has somehow been convinced to join the married half of the population. His fiancee, Anita, was apparently unphased by the photo of Oliver with another woman on the cover of the McGill phone directory. The wedding is scheduled for this coming August, assuming of course that Anita gets off the phone sometime within the next few months. Best wishes, Oliver and Anita!

☞Recent statistics show that the rate of increase in the size and number of academic journals will soon exceed the speed of light. Those involved in this study claim that there is no violation of relativity since no information is being transmitted.