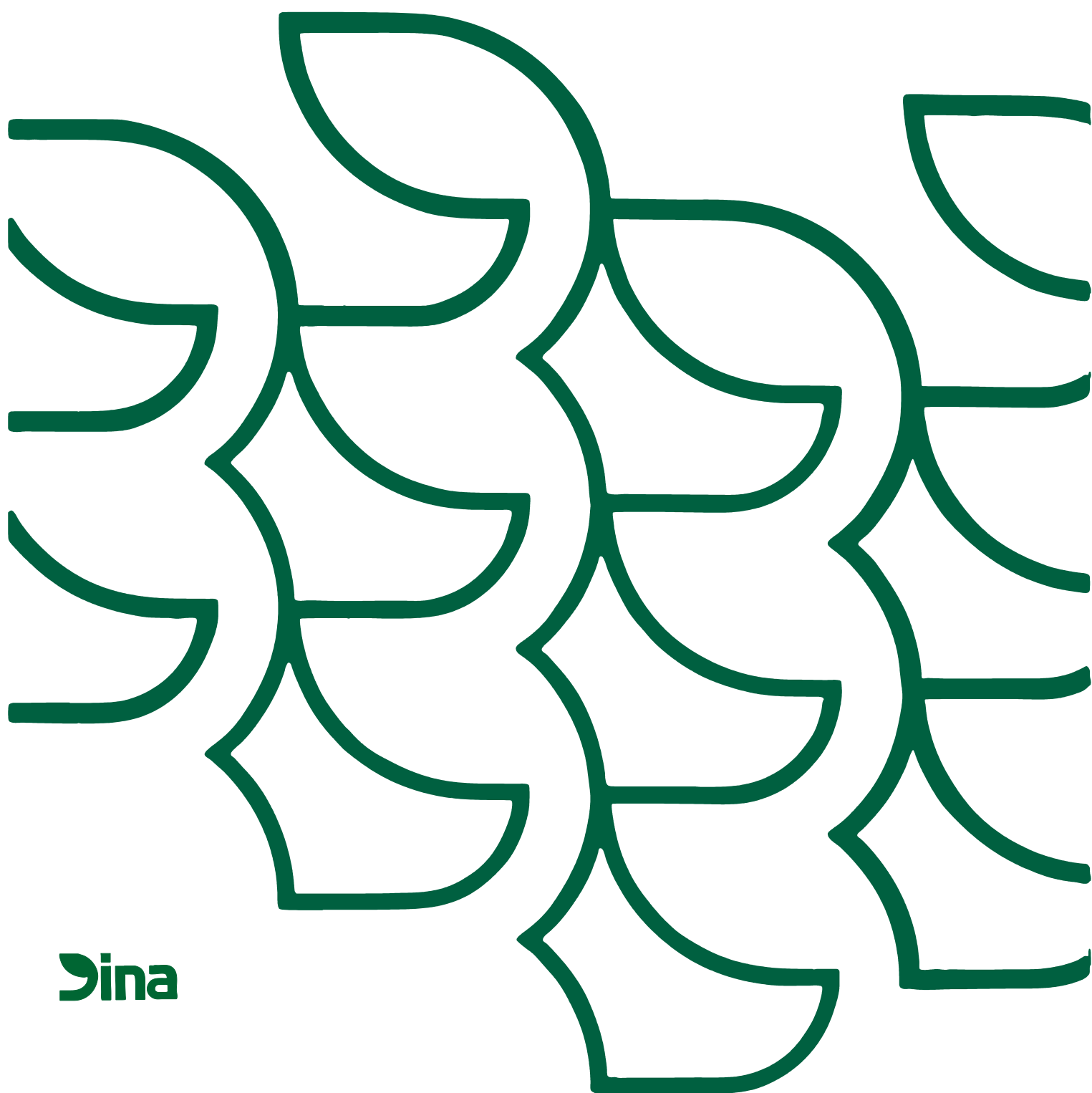


# The Dina Research School, 1997-2006

*Anders Ringgaard Kristensen and Peter Sestoft*

**Dina Notat No. 112 · October 2006**



**Dina**





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<http://www.dina.dk/phd/notat112.pdf>

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# Preface

Ever since the creation of the Dina network in 1991 research training activities within the area of informatics in agricultural research have been defined as a core element of the network. The Dina Research School was founded in 1997 as a continuation of this tradition.

Even though the research school is intended to serve all Dina member institutions, it is only at The Royal Veterinary and Agricultural University (KVL) that it has a formal status as a research school. It was the very first research school being created at KVL, so there was no tradition to rely on. Whereas most research schools today focus on PhD scholarships and closed fora for own PhD students, the Dina Research School has always had the organization of open workshops and PhD courses as its main purpose and activity. It is therefore rather untypical compared to other schools.

This short report summarizes the first 10 years of the research school from the foundation in 1997 until today.

KVL, October 2006

Anders Ringgaard Kristensen

Peter Sestoft

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## **1 Dina and the Dina Research School**

Dina, Danish Informatics Network in the Agricultural Sciences, is a framework for research in informatics applied in the agricultural sector. Dina was established by May 1991 as a network of three institutions within Danish agricultural research, The Danish Institute of Plant and Soil Science (DIPS), The National Institute of Animal Science (NIAS) and The Royal Veterinary and Agricultural University (KVL). The network has later been extended to include also Aalborg University, the Technical University of Denmark, The Danish Forest and Landscape Research Institute, Reseach Centre Risø and The Danish Agricultural Advisory Centre. The network was originally funded by grants from The Danish Research Councils and the Ministry of Food, Agriculture and Fisheries, but from 2000 it is funded entirely by the participating universities and research institutes.

The objective of Dina is to ensure intensified interdisciplinary research in applications of informatics in agricultural research. The long-term perspective is the creation of an open knowledge center for biometry and informatics. The network specializes in the use of mathematical, statistical, and computer science methods in agricultural research. Other objectives are the establishment and performance of a Ph.D. training program and communication of achieved knowledge as methods or prototypes to the agricultural sector. Besides working with specific research projects, Dina intends to be an analyzing, debating, inspiring and initiating organism deeply rooted in existing research environments. The key areas of research in Dina include model based decision support, image analysis and spatial statistics, use of the internet for extension, bioinformatics and quantitative genetics, and IT in agricultural engineering. Further information about Dina is available on world wide web at <http://www.dina.dk>.

The Dina network has until now financed approximately 20 Ph.D. projects. All Ph.D. students funded by Dina have to include a major course in computer science in their curricula. In 1997 the Dina Research School was established in order to strengthen the research training concerning the application of informatics in agricultural research. The objective of the research school is to support and inspire the research training of new academic staff members in the agricultural research, the advisory service and the agricultural sector in general. The support is rendered as courses, workshops or economically. The workshops and courses are open to all Ph.D. students whose projects in some sense combine agricultural disciplines with informatics disciplines. The participants include Ph.D. students with agricultural as well as informatics background. Further information about the Dina research school may be found at world wide web at <http://www.dina.dk/phd/>. The legal framework of the Dina Research School (in Danish) is shown in Appendix A.

## **2 The Nordic research training network: NINA**

On the initiative of the Dina Research School a Nordic research training network originally financed by NorFA has been established. The name of the network is NINA (Nordic Informatics Network in the Agricultural Sciences). The objectives of NINA are basically the same as for the Dina Research School, in particular to organize common summer courses.

Many agricultural Ph.D. projects include elements of informatics spanning from planning and evaluation of experiments to construction of advanced models requiring profound knowledge of numerical science, statistics and computer science. Aspects concerning statistical planning and evaluation of experiments are already to a large extent covered by existing Ph.D. courses at the Nordic Veterinary and Agricultural Universities.

In many projects, however, the demand for specific knowledge of informatics is far beyond the contents of existing courses. This is for instance the case for many projects within veterinary epidemiology, herd management, animal breeding, agricultural economics, soil science, agricultural engineering, cropping systems (precision farming), forestry and land use. The need for knowledge of informatics may for instance concern software construction, image analysis, spatial statistics, numerical methods, hierarchical statistical analysis, or decision theory. Since those aspects of informatics are only sparsely covered by existing Ph.D. courses at the veterinary and agricultural universities, there is an obvious need for training of veterinary and agricultural Ph.D. students within these disci-

plines in order to ensure a satisfactory scientific level in general. It is not realistic to assume that Ph.D. students from agricultural science should just attend Ph.D. courses given at other universities intended for students with a background in one of the informatics sciences.

Even though the need for informatics training applies to many Ph.D. students, the specific needs of the individual vary from project to project (and from person to person). The number of potential participants in a specific course is therefore rather limited. Thus a Nordic network for research training is a significantly better basis for such courses.

### **3 Collaboration with DaNet**

Since 2003 a formal collaboration between Dina and DaNet (Danish Agricultural Network in Engineering and Technology) has taken place. For the Dina Research School the consequence of the collaboration has been that a series of common PhD courses has been offered from 2003 to 2005. Furthermore, one of the experts of the Dina Research School has been a representative of DaNet.

### **4 Experts of the Dina Research School**

The Dina Research School has been headed by Anders Ringgaard Kristensen from the foundation in 1997 until now. Over the years, he has been assisted by the following experts:

Name	Scientific field	Period
Peter Sestoft (PS)	Computer science	1997 -
Henrik Stryhn (HS)	Statistics	1997 - 2001
Per Christian Hansen (PCH)	Numerical science	1997 - 2000
Per Grove Thomsen (PGT)	Numerical science	2001 - 2004 and 2006 -
Erik Jørgensen (EJ)	Assistant head	2002 - 2003
Rasmus Waagepetersen (RW)	Statistics	2002 -
Thomas Bak (TB)	Autonomous systems	2003 - 2005

### **5 Activities of the Dina Research School**

#### **5.1 Core activities**

The core activities of the Dina Research School have since the foundation been an annual summer school and two annual workshops. In recent years an annual PhD course entitled “Generalized linear models with biological applications” has been offered by the research school at Research Centre Foulum.

##### **5.1.1 Summer schools**

Summer schools are usually held over two weeks. All summer schools have been Nordic or Nordic/Baltic in scope (i.e. offered as part of the NINA network), except the first one (1998) which was a national Danish summer school. In total, 219 PhD students from Nordic and Baltic countries have attended the summer schools. All summer schools (except the first one in 1998) have been financed by grants from NorFA and the NOVA University Network.

Title	Where	When	#
Object oriented modelling and software development with agricultural applications	DK	Aug 2006	22
Likelihood-based inference for hierarchical/mixed statistical models	DK	Aug 2005	25
Pattern Recognition in High Dimensional Data and Complex Structures	SE	Jun 2004	26
Reasoning under Uncertainty in Agriculture: Bayesian Networks and Graphical Models	DK	Aug 2003	26
Design of Data Generation - Experimental Design	FI	Aug 2002	30
Geographical Information and Spatial Analysis in Agriculture	NO	Jun 2001	25
Differential Equations and Dynamic Systems in Agriculture	DK	Aug 2000	24
Computer Intensive Statistical Methods - with Biological Applications	DK	Aug 1999	23
Software construction in Java for agricultural applications	DK	Aug 1998	18

### 5.1.2 Workshops

Workshops are intensive courses held over two days. Here is the list in reverse chronological order, with title (in English), responsible organizer, and number of participants. In total, 309 PhD students have attended the workshops. The workshops are financed by the Dina member institutions.

Subject	Date	Responsible	#
The R system for computational data analysis	Dec 2005	PS, RW	29
Databases and webprogramming	Jan 2005	M. Larsen, PS	18
Tired of waiting? - statistics for time to event data	Oct 2004	RW, T. Martinussen	15
XML technologies for storing and exchanging data	Apr 2004	PS	18
Monte Carlo Methods for Hierarchical (Mixed) Models	Oct 2003	RW	17
Hybrid Systems	Nov 2002	A.P. Ravn	20
Dataserries, state-space models, and the Kalman filter	Apr 2002	RW	23
Visualization and data mining	Dec 2001	PGT	30
Digital image analysis	Dec 2000	M. Larsen	20
Biosequence analysis	Apr 2000	HS, PS	28
Dynamic simulation and differential equations	Dec 1999	PGT	18
Bayesian nets	Apr 1999	F.V. Jensen	19
Numerical problems and mathematical software	Dec 1998	PCH	16
Stochastic simulation	Apr 1998	HS, PCH, PS	18
Introductory workshop	Dec 1997	HS, PCH, PS	20

### 5.1.3 Generalized linear models with biological applications

An annual PhD course with the above mentioned title has been held at Research Centre Foulum since 2003. It is financed by the member institutions, and about 40 PhD students and other scientists have attended it.

## 5.2 Courses offered together with DaNet

A total of 7 PhD courses have been offered in collaboration with DaNet. They were developed as a networking activity within DaNet and supported jointly by the Danish Ministry of Technology, Science and Development and the Danish Ministry of Agriculture. The funding programme is Sustainable Technology in Agriculture. The

courses have been planned by DaNet in collaboration with The Dina Research School and NORBE, the Nordic School for Biosystems Engineering. In total, around 50 PhD students have attended these courses.

Subject	Date	Responsible
Sensor fusion	Aug 2005	M. Blanke
Hybrid systems	Apr 2005	A.P. Ravn
Biosystems Instrumentations	Mar 2005	S. Blackmore
New and emerging technologies for detection of microorganisms	Oct 2004	A.F. Justesen
Control and simulation of animal heat production, odour and ammonia emission for animal houses	Sep 2004	S. Pedersen, H. Takai
Computer Vision	Aug+Sep 2004	E. Granum
Feedback Systems	Mar+Apr 2004	H. Niemann

### 5.3 NINA activities

From 1999 to 2002 a separate network grant from NorFA made it possible to supplement the common NINA summer schools with other network activities. Those supplementary network activities included:

**Network meetings:** An annual meeting of the national contact persons of NINA was held.

**Nordic workshops:** The NINA network organized the following workshops for PhD students:

Subject	Date	Responsible
Spatial statistics in agriculture and forestry	Nov 2001	M. Larsen, R. Waagepetersen
Image analysis and spatial statistics in forestry	Nov 1999	M. Larsen, R. Waagepetersen
(Hybrid Systems)	Nov 2002	A.P. Ravn

The workshop on Hybrid Systems also served as an ordinary Dina Research School workshop. A total of 40 PhD students and other young scientists have attended the two first-mentioned workshops.

**“Common market” for seminars, symposia and workshops:** One of the goals of the Nordic network was to create a “common market” for seminars, symposia and workshops within the field of informatics (including computer science, mathematics and statistics) in relation to agriculture (including forestry, horticulture, veterinary medicine and food science). PhD students from the Nordic countries could apply for money for attending such events in other Nordic countries. Around 30 PhD students from the Nordic countries have attended such events.

**Short summer school:** In 2002 NINA (together with Agricultural University of Sweden) co-organized and partly financed a short summer school entitled “Modeling and Analysis of Biological Processes and Systems”. A total of 30 PhD students attended the short summer school.

### 5.4 Other PhD courses

The Dina Research School has on a few occasions organized PhD courses on specific subjects in collaboration with the member institutions.

## 6 PhD projects

Even though the primary objective of the Dina Research School is to run high quality courses and workshops, a few PhD students have also been officially attached to the Dina Research School.

## 7 The economical basis of the Dina Research School

The summer schools and the NINA network have been financed by grants from the NorFA and the NOVA University network, whereas the workshops, the experts and the head of the research school have been paid by the member institutions through the ordinary annual budget of Dina.

### 7.1 External grants

The external grants to the Dina Research School exceed 3,000,000 DKK. They have been distributed as follows over the years.

Event	Year	NOVA (DKK)	NorFA (DKK)
NINA network grant	1999-2002		498,562
Summer school	1999	192,256	
Summer school	2000	167,910	87,333
Baltic participant, summer school	2000		9,824
Summer school	2001	145,406	128,572
Baltic participants, summer school	2001		19,256
Summer school	2002	302,400	177,966
Summer school	2003	265,388	120,565
Summer school	2004		267,091
Summer school	2005	88,376	333,000
Summer school	2006	311,850	
Total external grants	1999-2006	1,473,586	1,642,169

### 7.2 Internal grants

The internal grants amount to 3,734,000 DKK. They are distributed over years as follows:

Year	Head	Experts	Workshops	Foulum course	General costs
1997	100,000	150,000	29,000		
1998	200,000	150,000	50,000		5,000
1999	200,000	150,000	50,000		5,000
2000	200,000	125,000	50,000		5,000
2001	200,000	105,000	30,000		5,000
2002	200,000	105,000	60,000	0	5,000
2003	175,000	135,000	50,000	30,000	5,000
2004	175,000	90,000	60,000	30,000	5,000
2005	175,000	135,000	75,000	30,000	5,000
2006	150,000	100,000	100,000	30,000	0
Total internal grants	1,775,000	1,245,000	554,000	120,000	40,000

## A The legal framework of the Dina Research School [In Danish]

### A.1 Vedtægter

I Dinas vedtægter (g6) er forskerskolen formål og opgaver beskrevet således:

- Stk. 1:** Dinas forskerskole har som formål at bidrage med støtte og inspiration til forskeruddannelse af informatikkyndige medarbejdere til jordbrugsforskningen, til rådgivningstjenesten og til erhvervet.
- Stk. 2:** Dette arbejde skal foregå i et aftalt samarbejde med og inden for rammerne af Ph.D. uddannelsesprogrammer ved universiteter og højere læreranstalter.
- Stk. 3:** Forskerskolens leder skal godkendes af bestyrelsen. Det skal være en videnskabelig medarbejder ved KVL på lektor- eller professorniveau. Arbejdets omfang, indhold og betaling skal fremgå af arbejdsprogrammet og det godkendte budget samt være aftalt med vedkommendes institut.
- Stk. 4:** I henhold til det godkendte budget og efter samråd med Dinas daglige ledelse udvælger lederen eksperter inden for informatikfagene og evt. andre fag til at deltage i planlægning af forskerskolen og dens aktiviteter.
- Stk. 5:** Til Ph.D. studerende inden for jordbrugsområdet skal forskerskolen planlægge og søge udviklet kursustilbud og -forløb med med solidt indhold af informatik. Til Ph.D. studerende inden for informatikfagene skal forskerskolen forsøge at tilbyde kurser og andre aktiviteter rettet mod anvendelser på jordbrugsområdet.
- Stk. 6:** Forskerskolen skal skabe et forum/mødested for Ph.D. studerende knyttet til Dina.
- Stk. 7:** Forskerskolen skal medvirke til at skaffe midler til at understøtte Ph.D. studier og til internationale Ph.D. kurser og workshops. Det kan f.eks. foregå i regi af EU- eller nordiske forskernetværk, af NOVA (Nordic Forestry, Veterinary and Agricultural University) og i samarbejde med Forskerakademiet, ATV's erhvervsforskerudvalg o.a., jf. 8 stk. 3.b.
- Stk. 8:** Den præcise form og betingelserne for økonomisk og anden støtte til den enkelte Ph.D. studerende fastlægges af forskerskolens leder ud fra det godkendte budget.

### A.2 Samarbejdsaftale med DaNet 2003-2005

Dina er et formelt netværk, der via sine vedtægter ejes af de 7 medvirkende institutioner (AAU, DJF, LR, FSL, DTU, KVL, Risø). DaNet er et uformelt netværk, der inden for sit formål koordinerer faglige aktiviteter. (Der deltager pt: AAU, KVL, DTU, SDU, Landsudvalget for Bygninger & Maskiner, Landsudvalget for Svin, Fødevarøkonomisk Institut, DVI, DJF, samt en række virksomheder)

6 projektgrupper inden for DaNet har modtaget bevillinger til projekter inden for forskningsprogrammet: Bæredygtig teknologi i jordbruget. SJVF, STVF og Fødevareministeriet har i den forbindelse betinget sig at der etableres et netværkssamarbejde mellem bevillingshaverne, herunder afholdes en række ph.d.-kurser inden for fagområderne. Der er afsat 2 mio. kr. til formålet, der frigives, når bevillingshaverne gennem den valgte koordinator forskningschef Svend Christensen har fremsendt og fået godkendt planer og budget. Det er samtidig aftalt at koordineringen af aktiviteterne sker via DaNet, således at ikke blot bevillingshaverne, men alle relevante fagmiljøer i Danmark, kan nyde godt af netværksaktiviteterne og af de udbudte ph.d.-kurser.

Bevillingshaverne har foreslået at professor Mogens Blanke over for forskningsrådene er ansvarlig for afholdelse af de planlagte ph.d.-kurser.

DaNet har i den forbindelse henvendt sig til Dina og forespurgt om Dina's forskerskole kunne danne den formelle ramme omkring de udbudte forskerkurser.

På baggrund af drøftelserne i Dinas Bestyrelse 6/12 2002 foreslås følgende koordinering mellem Dina og DaNet:

- Ph.d.-kurser og lign, der arrangeres i regi af DaNet indgår som en integreret del af Dinas Forskerskole. Dette udelukker dog ikke, at der kan arrangeres kurser i samarbejde med andre forskerskoler.
- Lederen af Dinas Forskerskole udpeger efter aftale med DaNet 1-2 nye eksperter til forskerskolens ledelse. Herved udvides forskerskolens faglige spektrum til også at omfatte teknologi i jordbruget.
- Forskerskolens ledelse aftaler med Mogens Blanke og Svend Christensen, hvilke kurser der afholdes i regi af Dinas forskerskole.

For at sikre en optimal koordinering mellem DaNets og Dinas aktiviteter gennemføres følgende:

- DaNets formand tilforordnes Dinas bestyrelse.
- DaNet udpeger 2 personer som medlemmer af Dinas Netkomite.
- DaNet indbetaler årligt kr. 30.000 pr. DaNet ekspert svarende til de ressourcer, som Dinas budget forøges med aht. dispositionsbeløb aflastning af forskerskolens eksperter til området teknologi i jordbruget.
- Dina, DaNet og DSII fortsætter afholdelse af fælles årsmøde og udarbejder i fællesskab budget for mødet. Aftalen er kun gældende såfremt DaNet opnår finansiering af projektet 'Network- and Research School activities in the research' under forskningsprogrammet 'Sustainable technology in agriculture' fra Forskningsstyrelsen (ansøgning fremsendt januar 2003).

Aftalen genforhandles senest i 2006 eller såfremt en af parterne måtte ønske dette.

Dato

Underskrifter

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