STATE UNIVERSITY OF NEW YORK
GRADUATE ACADEMIC PROGRAM PROPOSAL
COVER PAGE AND SUMMARY SHEET

Campus Cornell University **Date** 1/8/98

Proposed Program Title Atmospheric Science

Proposed Degree/Certificate M.S. and Ph.D.

HEGIS Classification and Number Atmospheric Sciences and Meteorology (#1913)

Department(s) or Academic Unit(s) to Offer Program Graduate Field of Soil, Crop and Atmospheric Sciences

Proposed First Enrollment Date 8/24/00

Please attach a brief (250 words maximum) summary of proposal, describing academic content, structure, credits, etc.

	Year I	Year II	Year III	Year IV	Year V
Projected Number of Students (Headcount)					
Full-Time	15	15	15	15	15
Part-Time	0	0	0	0	0
Projected Number of New Faculty					
Full-Time	0	0	0	0	0
Part-Time	0	0	0	0	0
Projected Number of New Support Staff					
Full-Time	0	0	0	0	0
Part-Time	0	0	0	0	0

NUMBER OF EXISTING FACULTY WHO WILL PARTICIPATE IN PROGRAM IN YEAR 1

	Full-Time	Part-Time	Adjunct	Regular (Tenured)	Regular (Untenured)
Professor	9	0	0	9	0
Associate Professor	3	0	0	3	0
Assistant Professor	0	0	0	0	0
Instructor	0	0	0	0	0

If program will lead to certification or licensure, please indicate field or specialty.

_____

If special accreditation will be sought, please: a) list accrediting bodies and b) indicate when you plan to seek accreditation.

_____

Please indicate locations(s) and projected enrollment for any off-campus offering of this program._____

Will students be able to complete all requirements for the program at the off-campus site(s)?

_____

IDENTIFY EXISTING PROGRAMS IN RELATED AND SUPPORTING DISCIPLINES

	STUDENTS		FACULTY	
Program Title	Full-Time	Part-Time	Full-Time	Part-Time

PROPOSAL SUMMARY

Graduate degree (M. S. and Ph. D.) programs in Atmospheric Science at Cornell University are proposed. These degree programs would be administered by a proposed new graduate Field of Atmospheric Science. Currently, Atmospheric Science is one of six concentrations available to students earning graduate degrees in the Field of Soil, Crop and Atmospheric Sciences (SCAS). Degree requirements for the newly proposed programs would be similar to those in effect for the field of SCAS, with specific courses of study tailored for individual students by the special committees for each student.

GRADUATE COURSES IN ATMOSPHERIC SCIENCE AT CORNELL

ASTRO 575 Atmospheric and Ionospheric Physics (offered alternate Fall semesters).

Energy balance and thermal structure of neutral atmospheres. Elements of circulation theory. Waves and instabilities. Coupling of lower atmospheres to upper atmospheres. Observations of the terrestrial atmosphere and of the other planets. Physical processes in the earth's ionosphere and magnetosphere. Production, loss and transport of charged particles. Electric fields. Coupling of neutral atmosphere dynamics with electirc fields and charged-particle transport. Diagnostic techniques, including radar and in situ observations. The equatorial electrojet. Observations of ionospheres on other planets.

ELE E 586 Solar Terrestrial Physics (offered alternate Spring semesters).

High latitude ionosphere; electric fields in the polar cap and auroral zone; particle precipitation and the aurora; magnetic and ionospheric storms; plasma instabilities in the ionosphere and magnetosphere; structure and physical processes in the sun, solar corona, and solar wind; interactions between the solar wind and the earth's magnetosphere; trapping, acceleration, and drift of energetic particles in the magnetosphere.

CEE 630 Advanced Fluid Dynamics (offered alternate Fall semesters).

Introduction to tensor analysis; conservation of mass, momentum, and energy. Rigorous treatment includes study of exact solutions of the Navier-Stokes equations. Asymptotic approximations at low and high Reynolds numbers. Similitude and modeling. Laminar diffusion of momentum, mass, and heat.

CEE 634 Boundary Layer Meteorology (offered alternate Fall semesters).

Physical processes in the lower atmospheric environment: turbulent transport in the lower atmospheric boundary layer, surface-air interaction, disturbed boundary layers, radiation. Applications include sensible and latent heat transfer from lakes, plant canopy flow and evapotransporation, turbulent diffusion from chimneys and cooling towers, and related design issues.

SCAS 635 Advanced Statistical Meteorology (offered every Fall semester).

Statistical methods used in climatology, operational weather forecasting, and selected meteorological research applications. Some statistical characteristics of meteorological data, including probability distributions, intercorrelations, and persistence. Operational forecasts derived from multiple regression models, including the MOS system. Forecast verification techniques and scoring rules. Time series analysis, EOFs, and other research topics as time permits.

CEE 636 Environmental Fluid Mechanics (offered alternate Spring semesters).

Mass- and heat-transport processes in the environment and their interaction with pollutant discharges. Mechanics of discretely and continuously stratified fluids, internal waves, density currents, selective withdrawal, and baroclinic motions. Flow stability, mixing, mixing and turbulence. Turbulent diffusion and shear flow diffusion, including effects of buoyancy. Convective instabilities and mixed-layer dynamics. Concentrated sources of momentum and buoyancy: jets and plumes and their behavior in the environment. Application to mixing processes in rivers, lakes, the ocean, and the atmosphere.

SCAS 652 Advanced Atmospheric Dynamics (offered alternate Spring semesters).

Quasigeostrophic theory, atmospheric waves, hydrodynamic instability, the general circulation of the atmoshere, and topics selected from among numerical weather prediction and tropical, mesoscale and middle atmosphere processes according to student interest.

SCAS 660 Remote Sensing Fundamentals (offered every Fall semester).

An introduction to equipment and methods used in obtaining information abou earth resources and the environment from aircraft or satellite. Coverage includes sensors, sensor and ground-data acquisition, data analysis and interpretation, and project design.

M&AE 734 Turbulence and Turbulent Flow (offered every Fall semester).

Topics include the dynamics of buoyancy and shear-driven turbulence, boundary-free and bounded shear flows, second-order modeling, the stastical description of turbulence, turbulent transport and spectral dynamics.

ATMOSPHERIC SCIENCE GRADUATE FACULTY MEMBERS

Wilfried Brutsaert (boundary layer meteorology and hydrology)
Civil and Environmental Engineering
117 Hollister Hall
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whb2@cornell.edu

Stephen Colucci (synoptic-dynamic meteorology)
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Kerry Cook (climate dynamics)
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Program Atmospheric Science Degree M.S. Ph.D.

Table 1
Data on Faculty Members Directly Associated with the Proposed Doctoral Program

Name	FT/PT	Dept	% Time to Doctoral Program	Sex M/F	R/E*	Articles in Refereed Journals 88-93	Dissertation Load 1992-93 Comm	Chr	No. Advisees 1992 - 1993 Doc	Mstrs	Classes Taught 1992 - 1993 GR	UG
Full Professor												
Wilfried Brutsaert	FT	CEE		M	W							
Donald Farley	FT	EE		M	W	13						
Peter Gierasch	FT	Astron		M	W	18						
Michael Kelley	FT	EE		M	W	45						
~~Paul Kintner~~ XXXXXXXXXXXXXXX	FT	EE		M	W							
Warren Knapp	FT	SCAS		M	W	- -						
Sidney Leibovich	FT	MAE		M	W	17						
John Lumley	FT	MAE		M	W	34						
Zellman Warhaft	FT	MAE		M	W	9						
XXXXXXXXXXXXXX												
Associate Professor												
Stephen Colucci	FT	SCAS		M	W	12	1	1	1	1	1	1
Kerry Cook	FT	SCAS		F	W	11			2	1	0	2
Daniel Wilks	FT	SCAS		M	W	26			0	0	0	2
Other												

*Racial/Ethnic Groups - Black (B), White (W), Hispanic (H), Native American Indian/Alaskan Native (N), Asian/Pacific Islander (A), Foreign (F)

Date _____

Institution _____ Degree _____

Program _____

Table 2
Data on Other Faculty Associated with the Proposed Doctoral Program (None)
(e.g., collaborative programs, master's programs)

Name	FT/PT	Dept	% Time to Doctoral Program	Sex M/F	R/E *	Articles in Refereed Journals 88-93	Dissertation Load 1992-93 Comm	Chr	No. Advisees 1992 - 1993 Doc	Mstrs	Classes Taught 1992 - 1993 GR	UG
Full Professor												
Associate Professor												
Assistant Professor												
Other												

*Racial/Ethnic Groups - Black (B), White (W), Hispanic (H), Native American Indian/Alaskan Native (N), Asian/Pacific Islander (A), Foreign (F)

RESEARCH GRANTS AND CONTRACTS:

Title	Prin. Inv.	Sponsor	Period	Amount
Northeast Regional Climate Center	Knapp	NOAA	6/95-5/96	$455,000
Northeast Regional Climate Center	Knapp	NOAA	6/96-5/97	$293,300
National Atmospheric Deposition Program	Knapp	USDA	10/92-9/97	$30,000
Use and Value of Meteorological Forecast Information In Agricultural Decision Making	Wilks	USDA	10/91-9/96	$30,000
Enhancements to the CPC Long-range Forecasts for Applications in the Northeastern United States	Wilks	NOAA	6/95-5/98	$73,208
Effects of Climate Variability on Crop Yield	Wilks/Riha	USDA	3/94-2/96	$40,500
Diagnostic Studies of Extended Range Weather Forecasts	Colucci	USDA	10/93-9/98	$25,000
Short-range Ensemble Prediction with the NCEP ETA Model	Colucci	NSF	8/95-8/98	$86,003
Improving Operational Forecasting of Lake-effect Snowstorms in the Eastern Great Lakes Region	Colucci	COMET	1/96-12/98	$9,767
Effects of Land Surface Conditions on Tropical Precipitation Distribution	Cook	NSF	4/93-3/97	$210,000
Climate, Erosion, and Tectonics in the Andes and Other Mountain System	Cook/Isack	NASA	1/91 - (FY 96)	$450,000
Response of the Atmospheric Dynamics to Changes in Surface Conditions	Cook	USDA	10/92-9/97	$27,500
Mechanisms of Climate Variability and Change Over the Tropical Continents	Cook	NASA	9/95-8/98	$66,000
Effects of Mechanical and Thermal Forcing by Mountains on Climate	Cook	NASA	9/93-8/96	$66,000
Global Hydrologic Processes and Climate	Brutsaert	NASA	11/91-10/96	$820,814
Planetary Atmospheres	Gierasch	NASA	1/94-1/95	$100,000
Jupiter Galileo Mission	Gierasch	NASA	1/94-1/95	$40,000
Saturn Cassini Mission	Gierasch	NASA	1/94-1/95	$11,000
Fine Sediment Dynamics	Jirka	ONR-DOS	9/93-8/96	$450,000
Support of Turbulence Modeling	Lumley	AFOSR	6/94-5/97	$151,032
Chaotic Mixing and Dispersion in Ocean Mixed Layers	Lumley/ Leibovich	ONR	4/92-3/96	$281,645
History Dependent Turbulence Modeling	Lumley	NASA Lewis	2/94-2/97	$104,958
Experimental Studies of Reynolds Number Dependence of Turbulent Mixing and Transport	Warhaft	DOE	6/94-6/97	$300,000.

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TABLE 3
PROJECTED STAFF FOR THE PROPOSED PROGRAM

Faculty/Staff	1st Year Academic Year[1] 2000-2001	2nd Year Academic Year[1] 2001-2002	3rd Year Academic Year[1] 2002-2003	4th Year Academic Year[1] 2003-2004	5th Year Academic Year[1] 2004-2005
Faculty					
01. Full-Time[2]	12	12	12	12	12
02. Existing[3]	12	12	12	12	12
03. New[4]	0	0	0	0	0
Faculty					
04. Part-Time[2]	0	0	0	0	0
05. Existing[3]	0	0	0	0	0
06. New[4]	0	0	0	0	0
Faculty					
07. Full-Time Equivalents (FTE)[5]	12	12	12	12	12
08. Existing FTE[3]	12	12	12	12	12
09. New FTE[4]	0	0	0	0	0

[1] Specify the academic year.
[2] This line must equal the total of Existing faculty plus New faculty.
[3] Existing means staff teaching in the proposed program that would have existed at the institution even if the proposed program were not approved.
[4] New means staff that will be employed specifically as a consequence of the proposed program. New FTE staff should be carried over t the following year as new FTE staff, if a continuing staff need.
[5] Describe the method used to compute Full-Time Equivalent faculty, administrative staff, and support staff. This number must equal the total of Existing plus New.

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TABLE 3 (Continued)

Faculty/Staff	1st Year Academic Year[1] 2000-2001	2nd Year Academic Year[1] 2001-2002	3rd Year Academic Year[1] 2002-2003	4th Year Academic Year[1] 2003-2004	5th Year Academic Year[1] 2004-2005
Administrative Staff					
10. Full-Time	0	0	0	0	0
11. Part-Time	1	1	1	1	1
12. Full-Time Equivalent(FTE)[5]	0.5	0.5	0.5	0.5	0.5
13. Existing FTE[3]	0.5	0.5	0.5	0.5	0.5
14. New FTE[4]	0	0	0	0	0
Support Staff					
15. Full-Time	0	0	0	0	0
16. Part-Time	1	1	1	1	1
17. Full-Time Equivalent (FTE)[5]	0.3	0.3	0.3	0.3	0.3
18. Existing FTE[3]	0.3	0.3	0.3	0.3	0.3
19. New FTE[4]	0	0	0	0	0

1 Specify the academic year.

2 This line must equal the total of Existing faculty plus New faculty.

3 Existing means staff teaching in the proposed program that would have existed at the institution even if the proposed program w
approved.

4 New means staff that will be employed specifically as a consequence of the proposed program. New FTE staff should be carrie
the following year as new FTE staff, if a continuing staff need.

5 Describe the method used to compute Full-Time Equivalent faculty, administrative staff, and support staff. This number must e
total of Existing plus New. percentage of time directed to the academic program

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TABLE 4
STUDENT CHARACTERISTICS

A. Anticipated Geographic Origin of Students in the Proposed Program

Indicate the percent from:	Full-Time	Part-Time
01. County in which the program will be offered	5	0
02. Remainder of Regents Post-secondary Region in which the program will be offered	5	0
03. Remainder of New York State	20	0
04. Other State	40	0
05. Foreign	30	0
06. Total	**100%**	**100%**

B. Anticipated Racial/Ethnic Characteristics of Full-Time and Part-Time Students (Headcount) in the Proposed Program

	Percent
07. Non-resident Alien	30
08. Black Non-Hispanic	5
09. American Indian or Alaskan Native	5
10. Asian or Pacific Islander	10
11. Hispanic	10
12. White, Non-Hispanic	40
13. Total	100%

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TABLE 5
PROJECTED ENROLLMENT IN THE PROPOSED PROGRAM

Enrollment	1st Year Academic Year[1] 2000-2001	2nd Year Academic Year[1] 2001-2002	3rd Year Academic Year[1] 2002-2003	4th Year Academic Year[1] 2003-2004	5th Year Academic Year[1] 2004-2005
Part A					
01. Full-Time Students	15	15	15	15	15
02. Part-Time Students	0	0	0	0	0
03. Total[2]	15	15	15	15	15
04. Full-Time Equivalent (FTE)[3] [4]	15	15	15	15	15
05. Existing FTE[5]	15	15	15	15	15
06. New FTE[6]	0	0	0	0	0
Part B	**Ultimate Enrollment Goal for the Proposed Program Academic Year:**				
07. Full-Time Students					
08. Part-Time Students					
09. Total					
10. Full-Time Equivalent (FTE)[3]					

[1] Specify the academic year; state whether enrollment is for the fall term or the average for the academic year.
[2] Describe how you arrived at the projected enrollment.
[3] Describe the method used to comput full-time equivalent enrollment.
[4] Must equal total of lines 05 and 06.
[5] Existing FTE enrollment means the FTE enrollment that would have existed at the institution even if the proposed program were not approved.
[6] New FTE Enrollment means the FTE enrollment that will be engendered specifically by the proposed program. New FTE enrollment fr the previous year should be carried over to the following year as new FTE enrollment, with adjustments for attrition and completions.

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TABLE 6

PROJECTED CAPITAL EXPENDITURES FOR THE PROPOSED PROGRAM

Expenditures	1st Year Academic Year[1] 2000-2001	2nd Year Academic Year[1] 2001-2002	3rd Year Academic Year[1] 2002-2003	4th Year Academic Year[1] 2003-2004	5th Year Academic Year[1] 2004-2005
01. Capital Facilities	0	0	0	0	0
02. Equipment (Capital Expenditures)[2]	0	0	0	0	0
03. Total Capital Expenditures	0	0	0	0	0

[1] Specify the academic year.

[2] Do not include equipment expenditures made from the operating budget; include these expenditures in Table 7.

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Program Atmospheric Sciences Degree M.S.
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TABLE 7
PROJECTED[1] EXPENDITURES FOR THE PROPOSED PROGRAM

Expenditures	1st Year Academic Year[2] 2000–2001	2nd Year Academic Year[2] 2001–2002	3rd Year Academic Year[2] 2002–2003	4th Year Academic Year[2] 2003–2004	5th Year Academic Year[2] 2004–2005
Faculty[3]					
01. From Existing Resources[4]	0	0	0	0	0
02. From New Resources[5]	0	0	0	0	0
03. Total	0	0	0	0	0
Administrative Staff[3]					
04. From Existing Resources[4]	0	0	0	0	0
05. From New Resources[5]	0	0	0	0	0
06. Total	0	0	0	0	0
Clerical Staff[3]					
07. From Existing Resources[4]	0	0	0	0	0
08. From New Resources[5]					
09. Total					

10. From Existing Resources[4]	$346,500	$363,825	$382,106	$401,117	$421,173
11. From New Resources[5]	0	0	0	0	0
12. Total					
Facilities[7]					
13. From Existing Resources[4]	0	0	0	0	0
14. From New Resources[5]	0	0	0	0	0
15. Total					

1 Specify inflation rate used for projections.
2 Specify the academic year.
3 Include fringe benefits.
4 Existing resources means expenditures pertaining to the proposed program that the institution would have or would receive even if the proposed program were not approved.
5 New resources means expenditures engendered specifically by the proposed program. The expenditures for new resources from the pre year should be carried over to the following year as expenditures for new resources with adjustments for inflation, if a continuing cost.
6 List number, type, source and dollar amounts of financial awards under the control of the institution.
7 Include here minor renovations not considered capital expenditures.

* $23,100 per year per student, increased by 5% per year, for 15 students

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TABLE 8

PROJECTED[1] EXPENDITURES FOR THE PROPOSED PROGRAM IN OTHER DEPARTMENTS

Expenditures	1st Year Academic Year[2] 2000–2001	2nd Year Academic Year[2] 2001–2002	3rd Year Academic Year[2] 2002–2003	4th Year Academic Year[2] 2003–2004	5th Year Academic Year[2] 2004–2005
Faculty[3]	0	0	0	0	0
New Resources[4]	0	0	0	0	0
Equipment[5]	0	0	0	0	0
New Resources[4]	0	0	0	0	0
Other[6]	0	0	0	0	0
New Resources[4]	0	0	0	0	0
Total (Other Departments)	0	0	0	0	0
New Resources[4]	0	0	0	0	0

[1] Specify inflation rate used for projections.
[2] Specify academic year.
[3] Include fringe benefits.
[4] New resources means resources in other Departments engendered by the proposed program (e.g., additional faculty teach support courses). The new resources from the previous year should be carried over to the following year as new resources with adjustments for inflation, if it is a continuing cost.
[5] Include here equipment which is not a capital expenditure.
[6] Specify what is included in "other" category, (e.g., library staff and additional acquisitions, student services staff).

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10. From Existing Sources[4]					
11. From New Sources[5]					
TOTAL	$129,415	$135,886	$142,680	$149,814	$157,305

[1] Specify inflation rate used for projections.
[2] Specify the academic year.
[3] Please explain how tuition revenue was calculated.
[4] Existing sources means revenue that would have been received by the institution even if the proposed program were not approved.
[5] New sources means revenue engendered by the proposed program. The revenues from new sources from the previous year should be carried over to the following year as revenues from new sources with adjustments for inflation, if a continuing source of revenue.
[6] Include here regular State appropriations applied to the program.
[7] Specify what is included in "other" category.
[8] Enter total of Tuition, State and Other Revenue, from Existing or New Sources.