



Calhoun: The NPS Institutional Archive

DSpace Repository

Faculty and Researchers

Faculty and Researchers' Publications

1980-01

Budget Allocation and Enlistment Prediction Models of Richard C. Morey: A Brief Review

Boger, Dan C.; Marshall, Kneale T.

Monterey, CA; Naval Postgraduate School

http://hdl.handle.net/10945/69414

This publication is a work of the U.S. Government as defined in Title 17, United States Code, Section 101. Copyright protection is not available for this work in the United States.

Downloaded from NPS Archive: Calhoun



Calhoun is the Naval Postgraduate School's public access digital repository for research materials and institutional publications created by the NPS community. Calhoun is named for Professor of Mathematics Guy K. Calhoun, NPS's first appointed -- and published -- scholarly author.

> Dudley Knox Library / Naval Postgraduate School 411 Dyer Road / 1 University Circle Monterey, California USA 93943

http://www.nps.edu/library

Working Paper Series



DEPARTMENT OF ADMINISTRATIVE SCIENCES

NAVAL POSTGRADUATE SCHOOL Monterey, California 93940

HD 31 W925 no.80.1 SUBLEY KNOX IN THE SCHOOL NACHT POINT THE SCHOOL WORLDDAY CALLYING

WORKING PAPER SERIES

The purpose of these working papers is to facilitate dialogue on tepics of interest to researchers and practitioners in the broad field of management.

The series provides a way to: (1) inform a variety of persons and communities within academia, industry and government of some of the work in process at the Naval Postgraduate School. (2) promote the generation and sharing of ideas that may not be formally publishable or officially sanctioned. (3) reduce the lengthy period between the submission of an article and its availability for wider readership; and (4) disseminate within the Navy and scholarly communities papers of a theoretical, polemical, exploratory or summary nature.

While the working paper series predominantly reflects the work of the faculty at the Naval Postgraduate School, other researchers and practitioners in the field are invited to submit appropriately typed and documented manuscripts for consideration. All manuscripts will be reviewed by at least three of the Department faculty at the Naval Postgraduate School for quality, relevance, and clarity of presentation. Additions and modifications of the distribution list are encouraged. Please send any comments, criticisms or rejoinders directly to the authors of the various papers. Other communications would be welcomed by the editor.

> Roger Evered, Editor Code 54Ev Department of Administrative Sciences Naval Postgraduate School Monterey, California 93940 Phone: (408) 646-2646

The views herein are solely the responsibility of the author and do not represent the official position of the U.S. Navy, the Naval Postgraduate School or the Department of Administrative Sciences.

BUDGET ALLOCATION AND ENLISTMENT PREDICTION MODELS OF RICHARD C. MOREY*: A BRIEF REVIEW

Dan C. Boger and Kneale T. Marshall**

January 1980

#80.1

- * Budget Allocation and Enlistment Prediction Models for the Navy's Recruiting Command; Richard C. Morey, Principal Investigator; May 1979 and October 1979; The center of Applied Business Research, Graduate School of Business, Duke University, Durham, N.C.
- ** Departments of Administrative Sciences and Operations Research, respectively, Naval Postgraduate School, Monterey, CA 93940.

COMMENTS ARE REQUESTED. PLEASE DO NOT QUOTE WITHOUT PERMISSION OF THE AUTHORS.

HD 31 W925 Mo.80.1





The subject reports were prepared to summarize work performed for the Office of Naval Research and the Naval Recruiting Command under a contract to measure the impact of recruiters and advertising on new Navy enlistment contracts. The reports describe a model of recruiting efforts which may be used to predict the number of new contracts given particular levels of recruiting inputs, such as advertising, recruiters, etc., as well as to determine minimal budget requirements for a desired level of new contracts. The May report provides a description of the entire model and its components along with the results of fitting the model to a preliminary data set. The October report provides results of fitting the model to a more complete data set. The principal investigator of these reports, R. C. Morey, was contacted by the reviewers in an attempt to clarify parts of the reports. Several of the points discussed below were raised with Morey, who generally agreed with the reviewers' positions.

TE SCHOOL

Briefly stated, the model is composed both of a three-equation system which relates various explanatory variables to enlistment contracts and a Koyck distributed lag system which is used to estimate the lagged effects of several of the explanatory variables. The model itself is apparently a very reasonable approach to the problem but the two reports are lacking in clarity. The reports are overly terse and do not describe the methods of fitting together the model components or the estimation techniques employed on the various model components. The most serious of these problems are discussed below.

On page 16 of the May report, the pooling technique utilized is valid only in certain restricted circumstances. The implicit assumption of this technique is that interdistrict differences occur only in the intercept term of the estimated equation and not in any of the slope parameters. The sample utilized is certainly large enough so that this assumption could have been tested in several ways using Chow tests. On page 19 of the May report, the Koyck lag structure for advertising is presented. It should be noted that equation (3) is inconsistent with both equation (2) and the equation used in the model. Also, the Koyck estimation is not included. Conversations with the principal investigator revealed that the model was apparently consistent, properly specified and correctly estimated, but that the report was misleading.

In the October report on page 10, re-estimated values are reported for several of the model parameters. Unfortunately, new values have not been reported for the parameters designated as $p_{i, j, 2}$. This does not permit the model to be verified using some of the partial equilibrium results derived over the years by the Recruiting Command. All re-estimated values should be included in this report.

All predicted values in the final versions of the model were reported as point estimates. The principal investigator should use the estimated standard errors from previous stages of the model to compute confidence intervals for the predictions. This is especially important when using the model in the budget requirements mode. The overall value of the model to users will be greatly enhanced if the users know what budget level will enable them to meet enlistment goals with, say, a probability of .95, given the model's assumptions. The principal investigator has reported that such confidence intervals are currently being calculated.

On page 7 of the October report, the principal investigator states that predicted values for 1978 contracts were obtained through use of 1976 and 1977 data for advertising, recruiters and enlistments together with 1978

2

demographic data. In practice, such demographic data are available only after the fact, so that a true test of predictive ability of the model would require use of solely 1976 and 1977 data in order to predict 1978 contracts. After the reports were written, the principal investigator did use this approach to measure the predictive ability of the model. He obtained a prediction error for total contracts of only four percent. This is a much more reasonable error than .2 percent but it also indicates that the model may still be used to obtain high quality predictions, at least in the short term.

Any potential user should realize that the model has been estimated using a large cross section and a short time series of observations. Since the estimated parameter values of the model reflect only this short time series, it is highly probable that the true parameter values will change over time. Hence, the model should periodically be re-estimated as more time series data become available. In this way, the model may be continually adapted to potentially changing circumstances. Finally, the estimates produced by this model, as with all predictive models, must be utilized in conjunction with a keen knowledge of the actual processes being modelled and tempered with professional judgment.

3

185675

HD 31 Boger W925 Bu no.°C.1 and dict Rich

Budget allocation and enlistment prediction models of Richard C. Morey.

NAVAL POSTGRADUATE SCHOOL Faculty of the Department of Administrative Sciences

*Robert Bobulinski M.S. Naval Postgraduate School Dan_Boger Ph.D. U. C. Berkeley *Phillip Butler Ph.D. U. C. San Diego Paul Carrick Ph.D. U. C. San Rekeley W. Howard Church M.S. U. Southern California John W. Creighton Ph.D. U. Michigan *Robert Cunningham M.S. Naval Postgraduate School Leslie Darbyshire Ph.D. U. Washington Phillip Ein-Dor Ph.D. Carnegie-Mellon Richard Elster Ph.D. U. Minnesota Carson Eoyang Ph.D. Stanford Ken Euske D.B.A. Arizona State Roger Evered Ph.D. UCLA *Edwin Fincke M.S. Naval Postgraduate School James Fremgen D.B.A. Indiana Reuben Harris Ph.D. ULA *Edwin Fincke M.S. Naval Postgraduate School Carl Jones, Chairman Ph.D. Claremont *Jerry Horton M.S. Naval Postgraduate School Carl Jones, Chairman Ph.D. UCLA Meryl Louis Ph.D. UCLA Norman Lyons Ph.D. Claremont *James O'Hare M.S. Naval Postgraduate School Carl Jones Ph.D. UCLA Norman Lyons Ph.D. Claremont *James O'Hare M.S. Naval Postgraduate School Carl Schairman Ph.D. UCLA Norman Lyons Ph.D. Claremont *James O'Hare M.S. Naval Postgraduate School Clair Peterson Ph.D. UCLA Norman Lyons Ph.D. Carnegie-Mellon Richard McGonigal Ph.D. UCLA Alan McMasters Ph.D. U. C. Berkeley Robert Nickerson Ph.D. Stanford *James O'Hare M.S. Naval Postgraduate School Clair Peterson Ph.D. MIT Denise Rousseau Ph.D. U. C. Berkeley Robert Sagehorn M.S. Naval Postgraduate School Norman Schneidewind D.B.A. U. Southern California John Senger Ph.D. JIllinois *Walter Skierkowski M.S. U. Nebraska George Thomas Ph.D. Purdue Roger Weissinger-Baylon Ph.D. Princeton David Whipple Ph.D. U. Kansas Chester Wright M.S. UICA	AP
Dan_BogerPh.D.U. C. Berkeley*Phillip ButlerPh.D.U. C. San DiegoPaul CarrickPh.D.U. C. San KeleyW. Howard ChurchM.S.U. Southern CaliforniaJohn W. CreightonPh.D.U. Michigan*Robert CunninghamM.S.Naval Postgraduate SchoolLeslie DarbyshirePh.D.U. WashingtonPhillip Ein-DorPh.D.U. MinnesotaCarson EoyangPh.D.U. MinnesotaCarson EoyangPh.D.UCLAKen EuskeD.B.A.Arizona StateRoger EveredPh.D.UCLA*Edwin FinckeM.S.Naval Postgraduate SchoolJames FremgenD.B.A.IndianaReuben HarrisPh.D.Claremont*Jerry HortonM.S.Naval Postgraduate SchoolCarl Jones, ChairmanPh.D.UCLADavid LammD.B.A.George Washington U.Shu LiaoPh.D.UICLANorman LyonsPh.D.Carnegie-MellonRichard McGonigalPh.D.UCLAAlam McMastersPh.D.U. C. BerkeleyRobert NickersonPh.D.Stanford*James O'HareM.S.Naval Postgraduate SchoolClair PetersonPh.D.Michigan StateAlan McMastersPh.D.U. C. BerkeleyRobert NickersonPh.D.Michigan StateAlan McMastersPh.D.Michigan StateAlan McMastersPh.D.Naval Postgraduate SchoolNorman SchneidewindD.B.A. <t< td=""><td>I</td></t<>	I
 *Phillip Butler Ph.D. U. C. San Diego Paul Carrick Ph.D. U. C. Berkeley W. Howard Church M.S. U. Southern California John W. Creighton Ph.D. U. Michigan *Robert Cunningham M.S. Naval Postgraduate School Leslie Darbyshire Ph.D. U. Washington Phillip Ein-Dor Ph.D. U. Washington Richard Elster Ph.D. U. Minnesota Carson Eoyang Ph.D. Stanford Ken Euske D.B.A. Arizona State Roger Evered Ph.D. UCLA *Edwin Fincke M.S. Naval Postgraduate School James Fremgen D.B.A. Indiana Reuben Harris Ph.D. Claremont *Jerry Horton M.S. Naval Postgraduate School Carl Jones, Chairman Ph.D. Claremont *Jerry Horton M.S. Naval Postgraduate School Carl Jones, Chairman Ph.D. UCLA Shu Liao Ph.D. UCLA Norman Lyons Ph.D. UCLA Norman Lyons Ph.D. UCLA Naval Postgraduate School Clair Peterson Ph.D. UCLA Naval Postgraduate School Carlegie-Hellon Richard McGonigal Ph.D. UCLA Naval Postgraduate School Clair Peterson Ph.D. UCLA Naval Postgraduate School Clair Peterson Ph.D. U. C. Berkeley Robert Nickerson Ph.D. Milt Denise Rousseau Ph.D. U. C. Berkeley Robert Sagehorn M.S. Naval Postgraduate School Clair Peterson Ph.D. Milt Denise Rousseau Ph.D. U. C. Berkeley Robert Sagehorn M.S. Naval Postgraduate School Clair Peterson Ph.D. Milt Denise Rousseau Ph.D. U. C. Berkeley Robert Sagehorn M.S. Naval Postgraduate School Clair Peterson Ph.D. Milt Denise Rousseau Ph.D. U. C. Berkeley Robert Sagehorn M.S. Naval Postgraduate School Clair Peterson Ph.D. Milt Denise Rousseau Ph.D. U. C. Berkeley Robert Sagehorn M.S. Naval Postgraduate School Norman Schneidewind D.B.A. U. Southern California John Senger Ph.D. Purdue Roger Weissinger-Baylon	aP
Paul CarrickPh.D.U. C. BerkeleyW. Howard ChurchM.S.U. Southern CaliforniaJohn W. CreightonPh.D.U. Michigan*Robert CunninghamM.S.Naval Postgraduate SchoolLeslie DarbyshirePh.D.U. WashingtonPhillip Ein-DorPh.D.U. WashingtonRichard ElsterPh.D.U. MinnesotaCarson EoyangPh.D.UCLA*Edwin FinckeM.S.Naval Postgraduate SchoolJames FremgenD.B.A.IndianaReuben HarrisPh.D.Claremont*Jerry HortonM.S.Naval Postgraduate SchoolCarl Jones, ChairmanPh.D.UCLA*Jerry HortonM.S.Naval Postgraduate SchoolCarl Jones, ChairmanPh.D.UCLAMelvin KlinePh.D.UCLADavid LammD.B.A.George Washington U.Shu LiaoPh.D.IllinoisMeryl LouisPh.D.UCLANorman LyonsPh.D.UCLAAlan McMastersPh.D.U. C. BerkeleyRobert NickersonPh.D.U. C. BerkeleyRobert SagehornM.S.Naval Postgraduate SchoolClair PetersonPh.D.MitDenise RousseauPh.D.U. C. BerkeleyRobert SagehornM.S.Naval Postgraduate SchoolNorman SchneidewindD.B.A.U. Southern CaliforniaJohn SengerPh.D.Illinois*Walter SkierkowskiM.S.U. NebraskaGeorge IhomasPh.D.Ill	I
W. Howard ChurchM.S.U. Southern CaliforniaJohn W. CreightonPh.D.U. Michigan*Robert CunninghamM.S.Naval Postgraduate SchoolLeslie DarbyshirePh.D.U. WashingtonPhillip Ein-DorPh.D.Carnegie-MellonRichard ElsterPh.D.U. MinnesotaCarson EoyangPh.D.UCLAKen EuskeD.B.A.Arizona StateRoger EveredPh.D.UCLA*Edwin FinckeM.S.Naval Postgraduate SchoolJames FremgenD.B.A.IndianaReuben HarrisPh.D.Claremont*Jerry HortonM.S.Navàl Postgraduate SchoolCarl Jones, ChairmanPh.D.Claremont*Jerry HortonM.S.Navàl Postgraduate SchoolCarl Jones, ChairmanPh.D.UCLAMelvin KlinePh.D.UCLAMeryl LouisPh.D.IllinoisMeryl LouisPh.D.UCLANorman LyonsPh.D.UCLARobert NickersonPh.D.UCLANorman SchneidewindD.B.A.George Washington U.*James O'HareM.S.Naval Postgraduate SchoolClair PetersonPh.D.UCLA*Bobert NickersonPh.D.MiTDenise RousseauPh.D.U. C. BerkeleyRobert SagehornM.S.Naval Postgraduate SchoolNorman SchneidewindD.B.A.U. Southern CaliforniaJohn SengerPh.D.Illinois*Walter SkierkowskiM.S.U. Nebraska <td>AP</td>	AP
John W. CreightonPh.D.U. Michigan*Robert CunninghamM.S.Naval Postgraduate SchoolLeslie DarbyshirePh.D.U. WashingtonPhillip Ein-DorPh.D.Carnegie-MellonRichard ElsterPh.D.U. MinnesotaCarson EoyangPh.D.StanfordKen EuskeD.B.A.Arizona StateRoger EveredPh.D.UCLA*Edwin FinckeM.S.Naval Postgraduate SchoolJames FremgenD.B.A.IndianaReuben HarrisPh.D.StanfordFenn HortonPh.D.Claremont*Jerry HortonM.S.Naval Postgraduate SchoolCarl Jones, ChairmanPh.D.ClaremontMelvin KlinePh.D.UCLADavid LammD.B.A.George Washington U.Shu LiaoPh.D.IllinoisMeryl LouisPh.D.UCLANorman LyonsPh.D.Carnegie-MellonRichard McGonigalPh.D.U. C. BerkeleyRobert NickersonPh.D.Michigan StateAlan McMastersPh.D.MITDenise RousseauPh.D.MITDenise RousseauPh.D.Illinois*Walter SkierkowskiM.S.U. NebraskaGeorge ThomasPh.D.Illinois*Walter SkierkowskiM.S.U. NebraskaGeorge ThomasPh.D.PurdueRobert SagehornM.S.U. NebraskaGeorge ThomasPh.D.PurdueRobert SkierkowskiM.S.U. Nebraska </td <td>Р</td>	Р
*Robert CunninghamM.S.Naval Postgraduate SchoolLeslie DarbyshirePh.D.U. WashingtonPhillip Ein-DorPh.D.Carnegie-MellonRichard ElsterPh.D.U. MinnesotaCarson EoyangPh.D.StanfordKen EuskeD.B.A.Arizona StateRoger EveredPh.D.UCLA*Edwin FinckeM.S.Naval Postgraduate SchoolJames FremgenD.B.A.IndianaReuben HarrisPh.D.Claremont*Jerry HortonM.S.Naval Postgraduate SchoolCarl Jones, ChairmanPh.D.Claremont*Jerry HortonM.S.Naval Postgraduate SchoolCarl Jones, ChairmanPh.D.UCLADavid LammD.B.A.George Washington U.Shu LiaoPh.D.ULLANorman LyonsPh.D.UCLANorman LyonsPh.D.UCLAAlan McMastersPh.D.U. C. BerkeleyRobert NickersonPh.D.Michigan StateAlan McMastersPh.D.MITDenise RousseauPh.D.MITDenise RousseauPh.D.Illinois*James O'HareM.S.Naval Postgraduate SchoolNorman SchneidewindD.B.A.U. Southern CaliforniaJohn SengerPh.D.Illinois*Walter SkierkowskiM.S.U. NebraskaGeorge ThomasPh.D.PurdueRoger Weissinger-Baylon Ph.D.StanfordRomas SchneidewindD.B.A.U. NebraskaGeorge Thomas </td <td>Р</td>	Р
Leslie DarbyshirePh.D.U. WashingtonPhillip Ein-DorPh.D.Carnegie-MellonRichard ElsterPh.D.U. MinnesotaCarson EoyangPh.D.StanfordKen EuskeD.B.A.Arizona StateRoger EveredPh.D.UCLA*Edwin FinckeM.S.Naval Postgraduate SchoolJames FrengenD.B.A.IndianaReuben HarrisPh.D.StanfordFenn HortonPh.D.Claremont*Jerry HortonM.S.Naval Postgraduate SchoolCarl Jones, ChairmanPh.D.ClaremontMelvin KlinePh.D.UCLADavid LammD.B.A.George Washington U.Shu LiaoPh.D.IllinoisMeryl LouisPh.D.UCLANorman LyonsPh.D.UCLAAlan McMastersPh.D.U. C. BerkeleyRobert NickersonPh.D.U. C. BerkeleyRobert NickersonPh.D.U. C. BerkeleyRobert SagehornM.S.Naval Postgraduate SchoolClair PetersonPh.D.U. C. BerkeleyRobert SagehornM.S.Naval Postgraduate SchoolNorman SchneidewindD.B.A.U. Southern CaliforniaJohn SengerPh.D.Illinois*Walter SkierkowskiM.S.U. NebraskaGeorge ThomasPh.D.PurdueRobert SagehornM.S.U. NebraskaGeorge ThomasPh.D.PurdueRobert Skinger-Baylon Ph.D.V. NebraskaGeorge ThomasPh	I
Phillip Ein-DorPh.D.Carnegie-MellonRichard ElsterPh.D.U. MinnesotaCarson EoyangPh.D.StanfordKen EuskeD.B.A.Arizona StateRoger EveredPh.D.UCLA*Edwin FinckeM.S.Naval Postgraduate SchoolJames FremgenD.B.A.IndianaReuben HarrisPh.D.StanfordFenn HortonPh.D.Claremont*Jerry HortonM.S.Naval Postgraduate SchoolCarl Jones, ChairmanPh.D.UCLADavid LammD.B.A.George Washington U.Shu LiaoPh.D.UILANorman LyonsPh.D.UCLANorman LyonsPh.D.U. C. BerkeleyRobert NickersonPh.D.U. C. BerkeleyRobert SagehornM.S.Naval Postgraduate SchoolClair PetersonPh.D.U. C. BerkeleyRobert SagehornM.S.Naval Postgraduate SchoolNorman SchneidewindD.B.A.U. Southern CaliforniaJohn SengerPh.D.Illinois*Walter SkierkowskiM.S.U. NebraskaGeorge ThomasPh.D.Illinois*Walter SkierkowskiM.S.U. NebraskaGeorge ThomasPh.D.PurdueRoger Weissinger-Baylon Ph.D.StanfordRobert MrightPh.D.U. KansasChester WrightM.S.U. Kansas	Р
Richard ElsterPh.D.U. MinnesotaCarson EoyangPh.D.StanfordKen EuskeD.B.A.Arizona StateRoger EveredPh.D.UCLA*Edwin FinckeM.S.Naval Postgraduate SchoolJames FrengenD.B.A.IndianaReuben HarrisPh.D.StanfordFenn HortonPh.D.Claremont*Jerry HortonM.S.Naval Postgraduate SchoolCarl Jones, ChairmanPh.D.UCLAMelvin KlinePh.D.UCLADavid LammD.B.A.George Washington U.Shu LiaoPh.D.UILANorman LyonsPh.D.UCLANorman LyonsPh.D.U. C. BerkeleyRobert NickersonPh.D.U. C. BerkeleyRobert SagehornM.S.Naval Postgraduate SchoolClair PetersonPh.D.U. C. BerkeleyRobert SagehornM.S.Naval Postgraduate SchoolNorman SchneidewindD.B.A.U. Southern CaliforniaJohn SengerPh.D.Illinois*Walter SkierkowskiM.S.U. NebraskaGeorge ThomasPh.D.Illinois*Walter SkierkowskiM.S.U. NebraskaGeorge ThomasPh.D.PurdueRoger Weissinger-Baylon Ph.D.StanfordRobert MrightPh.D.U. KansasChester WrightM.S.U. Kansas	Ad
Carson EoyangPh.D.StanfordKen EuskeD.B.A.Arizona StateRoger EveredPh.D.UCLA*Edwin FinckeM.S.Naval Postgraduate SchoolJames FremgenD.B.A.IndianaReuben HarrisPh.D.StanfordFenn HortonPh.D.Claremont*Jerry HortonM.S.Navàl Postgraduate SchoolCarl Jones, ChairmanPh.D.ClaremontMelvin KlinePh.D.UCLADavid LammD.B.A.George Washington U.Shu LiaoPh.D.IllinoisMeryl LouisPh.D.UCLANorman LyonsPh.D.UCLAAlam McMastersPh.D.U. C. BerkeleyRobert NickersonPh.D.U. C. BerkeleyRobert SagehornM.S.Naval Postgraduate SchoolClair PetersonPh.D.U. C. BerkeleyRobert SagehornM.S.Naval Postgraduate SchoolNorman SchneidewindD.B.A.U. Southern CaliforniaJohn SengerPh.D.Illinois*Walter SkierkowskiM.S.U. NebraskaGeorge ThomasPh.D.PurdueRoger Weissinger-Baylon Ph.D.StanfordRon WeitzmanPh.D.U. KansasChester WrightM.D.U. Kansas	P
Ken EuskeD.B.A.Arizona StateRoger EveredPh.D.UCLA*Edwin FinckeM.S.Naval Postgraduate SchoolJames FremgenD.B.A.IndianaReuben HarrisPh.D.StanfordFenn HortonPh.D.Claremont*Jerry HortonM.S.Naval Postgraduate SchoolCarl Jones, ChairmanPh.D.ClaremontMelvin KlinePh.D.UCLADavid LammD.B.A.George Washington U.Shu LiaoPh.D.ULANorman LyonsPh.D.UCLANorman LyonsPh.D.UCLAAlan McMastersPh.D.U. C. BerkeleyRobert NickersonPh.D.U. C. BerkeleyRobert SagehornM.S.Naval Postgraduate SchoolClair PetersonPh.D.U. C. BerkeleyRobert SagehornM.S.Naval Postgraduate SchoolNorman SchneidewindD.B.A.U. Southern CaliforniaJohn SengerPh.D.Illinois*Walter SkierkowskiM.S.U. NebraskaGeorge ThomasPh.D.PurdueRoger Weissinger-Baylon Ph.D.PrincetonDavid WhipplePh.D.U. KansasChester WrightM.S.U. Kansas	AP
Roger EveredPh.D.UCLA*Edwin FinckeM.S.Naval Postgraduate SchoolJames FremgenD.B.A.IndianaReuben HarrisPh.D.StanfordFenn HortonPh.D.Claremont*Jerry HortonM.S.Naval Postgraduate SchoolCarl Jones, ChairmanPh.D.ClaremontMelvin KlinePh.D.UCLADavid LammD.B.A.George Washington U.Shu LiaoPh.D.UILANorman LyonsPh.D.UCLANorman LyonsPh.D.UCLANorman LyonsPh.D.UCLANorman LyonsPh.D.UCLANorman LyonsPh.D.UCLANorman LyonsPh.D.UCLANorman LyonsPh.D.UCLANorman LyonsPh.D.U. C. BerkeleyRobert NickersonPh.D.U. C. BerkeleyRobert NickersonPh.D.MITDenise RousseauPh.D.U. C. BerkeleyRobert SagehornM.S.Naval Postgraduate SchoolNorman SchneidewindD.B.A.U. Southern CaliforniaJohn SengerPh.D.Illinois*Walter SkierkowskiM.S.U. NebraskaGeorge ThomasPh.D.PurdueRoger Weissinger-Baylon Ph.D.PurdueRoger Weissinger-Baylon Ph.D.PurdueRoger Weissinger-Baylon Ph.D.PurdueRoger WeitzmanPh.D.U. KansasChester WrightM.S.UCLA	aP
*Edwin FinckeM.S.Naval Postgraduate SchoolJames FremgenD.B.A.IndianaReuben HarrisPh.D.StanfordFenn HortonPh.D.Claremont*Jerry HortonM.S.Naval Postgraduate SchoolCarl Jones, ChairmanPh.D.ClaremontMelvin KlinePh.D.UCLADavid LammD.B.A.George Washington U.Shu LiaoPh.D.UILANorman LyonsPh.D.UCLANorman LyonsPh.D.UCLARobert NickersonPh.D.Carnegie-MellonRichard McGonigalPh.D.U. C. BerkeleyRobert NickersonPh.D.Michigan StateAlan McMastersPh.D.MITDenise RousseauPh.D.MITDenise RousseauPh.D.U. C. BerkeleyRobert SagehornM.S.Naval Postgraduate SchoolNorman SchneidewindD.B.A.U. Southern CaliforniaJohn SengerPh.D.Illinois*Walter SkierkowskiM.S.U. NebraskaGeorge ThomasPh.D.PurdueRoger Weissinger-Baylon Ph.D.PurdueRoger Weissinger-Baylon Ph.D.PurdueRoger Weissinger-Baylon Ph.D.U. KansasChester WrightM.S.UCLA	AP
James FremgenD.B.A.IndianaReuben HarrisPh.D.StanfordFenn HortonPh.D.Claremont*Jerry HortonM.S.Navàl Postgraduate SchoolCarl Jones, ChairmanPh.D.ClaremontMelvin KlinePh.D.UCLADavid LammD.B.A.George Washington U.Shu LiaoPh.D.IllinoisMeryl LouisPh.D.UCLANorman LyonsPh.D.UCLANorman LyonsPh.D.U. C. BerkeleyRobert NickersonPh.D.U. C. BerkeleyRobert NickersonPh.D.Michigan StateAlam S O'HareM.S.Naval Postgraduate SchoolClair PetersonPh.D.MITDenise RousseauPh.D.U. C. BerkeleyRobert SagehornM.S.Naval Postgraduate SchoolNorman SchneidewindD.B.A.U. Southern CaliforniaJohn SengerPh.D.Illinois*Walter SkierkowskiM.S.U. NebraskaGeorge ThomasPh.D.PurdueRoger Weissinger-Baylon Ph.D.StanfordRon WeitzmanPh.D.PrincetonDavid WhipplePh.D.U. KansasChester WrightM.S.U. C. A	I
Reuben HarrisPh.D.StanfordFenn HortonPh.D.Claremont*Jerry HortonM.S.Navàl Postgraduate SchoolCarl Jones, ChairmanPh.D.ClaremontMelvin KlinePh.D.UCLADavid LammD.B.A.George Washington U.Shu LiaoPh.D.IllinoisMeryl LouisPh.D.UCLANorman LyonsPh.D.UCLANorman LyonsPh.D.UCLANorman LyonsPh.D.U.C. BerkeleyRobert NickersonPh.D.U. C. BerkeleyRobert NickersonPh.D.U. C. BerkeleyRobert SagehornM.S.Naval Postgraduate SchoolClair PetersonPh.D.U. C. BerkeleyRobert SagehornM.S.Naval Postgraduate SchoolNorman SchneidewindD.B.A.U. Southern CaliforniaJohn SengerPh.D.Illinois*Walter SkierkowskiM.S.U. NebraskaGeorge ThomasPh.D.PurdueRoger Weissinger-Baylon Ph.D.StanfordRon WeitzmanPh.D.U. KansasChester WrightM.S.U. Kansas	Р
Fenn HortonPh.D.Claremont*Jerry HortonM.S.Navàl Postgraduate SchoolCarl Jones, ChairmanPh.D.ClaremontMelvin KlinePh.D.UCLADavid LammD.B.A.George Washington U.Shu LiaoPh.D.IllinoisMeryl LouisPh.D.UCLANorman LyonsPh.D.UCLANorman LyonsPh.D.UCLANorman LyonsPh.D.UCLANorman LyonsPh.D.U.C. BerkeleyRobert NickersonPh.D.U. C. BerkeleyRobert NickersonPh.D.Stanford*James O'HareM.S.Naval Postgraduate SchoolClair PetersonPh.D.U. C. BerkeleyRobert SagehornM.S.Naval Postgraduate SchoolNorman SchneidewindD.B.A.U. Southern CaliforniaJohn SengerPh.D.Illinois*Walter SkierkowskiM.S.U. NebraskaGeorge ThomasPh.D.PurdueRoger Weissinger-Baylon Ph.D.StanfordRon WeitzmanPh.D.U. KansasChester WrightM.S.U. Kansas	AP
*Jerry HortonM.S.Navàl Postgraduate SchoolCarl Jones, ChairmanPh.D.ClaremontMelvin KlinePh.D.UCLADavid LammD.B.A.George Washington U.Shu LiaoPh.D.IllinoisMeryl LouisPh.D.UCLANorman LyonsPh.D.UCLANorman LyonsPh.D.UCLAAlan McGonigalPh.D.UCLAAlan McMastersPh.D.U. C. BerkeleyRobert NickersonPh.D.Stanford*James O'HareM.S.Naval Postgraduate SchoolClair PetersonPh.D.MITDenise RousseauPh.D.U. C. BerkeleyRobert SagehornM.S.Naval Postgraduate SchoolNorman SchneidewindD.B.A.U. Southern CaliforniaJohn SengerPh.D.Illinois*Walter SkierkowskiM.S.U. NebraskaGeorge ThomasPh.D.PurdueRoger Weissinger-Baylon Ph.D.StanfordRon WeitzmanPh.D.U. KansasChester WrightM.S.U. Kansas	AP
Carl Jones, ChairmanPh.D.ClaremontMelvin KlinePh.D.UCLADavid LammD.B.A.George Washington U.Shu LiaoPh.D.IllinoisMeryl LouisPh.D.UCLANorman LyonsPh.D.UCLANorman LyonsPh.D.Carnegie-MellonRichard McGonigalPh.D.Michigan StateAlan McMastersPh.D.U. C. BerkeleyRobert NickersonPh.D.U. C. BerkeleyRobert NickersonPh.D.MITDenise RousseauPh.D.U. C. BerkeleyRobert SagehornM.S.Naval Postgraduate SchoolNorman SchneidewindD.B.A.U. Southern CaliforniaJohn SengerPh.D.Illinois*Walter SkierkowskiM.S.U. NebraskaGeorge ThomasPh.D.PurdueRoger Weissinger-Baylon Ph.D.StanfordRow WeitzmanPh.D.U. KansasDavid WhipplePh.D.U. KansasChester WrightM.S.UCLA	I
Melvin KlinePh.D.UCLADavid LammD.B.A.George Washington U.Shu LiaoPh.D.IllinoisMeryl LouisPh.D.UCLANorman LyonsPh.D.UCLANorman LyonsPh.D.UCLAAlan McGonigalPh.D.Michigan StateAlan McMastersPh.D.U. C. BerkeleyRobert NickersonPh.D.Stanford*James O'HareM.S.Naval Postgraduate SchoolClair PetersonPh.D.U. C. BerkeleyRobert SagehornM.S.Naval Postgraduate SchoolNorman SchneidewindD.B.A.U. Southern CaliforniaJohn SengerPh.D.Illinois*Walter SkierkowskiM.S.U. NebraskaGeorge ThomasPh.D.StanfordRoger Weissinger-Baylon Ph.D.StanfordRon WeitzmanPh.D.U. KansasDavid WhipplePh.D.U. KansasChester WrightM.S.UCLA	Р
David LammD.B.A.George Washington U.Shu LiaoPh.D.IllinoisMeryl LouisPh.D.UCLANorman LyonsPh.D.UCLANorman LyonsPh.D.Carnegie-MellonRichard McGonigalPh.D.Michigan StateAlan McMastersPh.D.U. C. BerkeleyRobert NickersonPh.D.Stanford*James O'HareM.S.Naval Postgraduate SchoolClair PetersonPh.D.MITDenise RousseauPh.D.U. C. BerkeleyRobert SagehornM.S.Naval Postgraduate SchoolNorman SchneidewindD.B.A.U. Southern CaliforniaJohn SengerPh.D.Illinois*Walter SkierkowskiM.S.U. NebraskaGeorge ThomasPh.D.StanfordRoger Weissinger-Baylon Ph.D.StanfordRon WeitzmanPh.D.U. KansasChester WrightM.S.UCLA	Р
Shu LiaoPh.D.IllinoisMeryl LouisPh.D.UCLANorman LyonsPh.D.Carnegie-MellonRichard McGonigalPh.D.Michigan StateAlan McMastersPh.D.U. C. BerkeleyRobert NickersonPh.D.U. C. BerkeleyRobert NickersonPh.D.Stanford*James O'HareM.S.Naval Postgraduate SchoolClair PetersonPh.D.MITDenise RousseauPh.D.U. C. BerkeleyRobert SagehornM.S.Naval Postgraduate SchoolNorman SchneidewindD.B.A.U. Southern CaliforniaJohn SengerPh.D.Illinois*Walter SkierkowskiM.S.U. NebraskaGeorge ThomasPh.D.PurdueRoger Weissinger-Baylon Ph.D.StanfordRon WeitzmanPh.D.U. KansasChester WrightM.S.U. Kansas	aP
Meryl LouisPh.D.UCLANorman LyonsPh.D.Carnegie-MellonRichard McGonigalPh.D.Michigan StateAlan McMastersPh.D.U. C. BerkeleyRobert NickersonPh.D.Stanford*James O'HareM.S.Naval Postgraduate SchoolClair PetersonPh.D.MITDenise RousseauPh.D.U. C. BerkeleyRobert SagehornM.S.Naval Postgraduate SchoolNorman SchneidewindD.B.A.U. Southern CaliforniaJohn SengerPh.D.Illinois*Walter SkierkowskiM.S.U. NebraskaGeorge ThomasPh.D.PurdueRoger Weissinger-Baylon Ph.D.StanfordRon WeitzmanPh.D.U. KansasDavid WhipplePh.D.U. KansasChester WrightM.S.UCLA	AP
Norman LyonsPh.D.Carnegie-MellonRichard McGonigalPh.D.Michigan StateAlan McMastersPh.D.U. C. BerkeleyRobert NickersonPh.D.Stanford*James O'HareM.S.Naval Postgraduate SchoolClair PetersonPh.D.MITDenise RousseauPh.D.U. C. BerkeleyRobert SagehornM.S.Naval Postgraduate SchoolNorman SchneidewindD.B.A.U. Southern CaliforniaJohn SengerPh.D.Illinois*Walter SkierkowskiM.S.U. NebraskaGeorge ThomasPh.D.PurdueRoger Weissinger-Baylon Ph.D.StanfordDavid WhipplePh.D.U. KansasChester WrightM.S.U. Kansas	aP
Richard McGonigalPh.D.Michigan StateAlan McMastersPh.D.U. C. BerkeleyRobert NickersonPh.D.Stanford*James O'HareM.S.Naval Postgraduate SchoolClair PetersonPh.D.MITDenise RousseauPh.D.U. C. BerkeleyRobert SagehornM.S.Naval Postgraduate SchoolNorman SchneidewindD.B.A.U. Southern CaliforniaJohn SengerPh.D.Illinois*Walter SkierkowskiM.S.U. NebraskaGeorge ThomasPh.D.PurdueRoger Weissinger-Baylon Ph.D.StanfordDavid WhipplePh.D.U. KansasChester WrightM.S.U. Kansas	AP
Alan McMastersPh.D.U. C. BerkeleyRobert NickersonPh.D.Stanford*James O'HareM.S.Naval Postgraduate SchoolClair PetersonPh.D.MITDenise RousseauPh.D.U. C. BerkeleyRobert SagehornM.S.Naval Postgraduate SchoolNorman SchneidewindD.B.A.U. Southern CaliforniaJohn SengerPh.D.Illinois*Walter SkierkowskiM.S.U. NebraskaGeorge ThomasPh.D.PurdueRoger Weissinger-Baylon Ph.D.StanfordRon WeitzmanPh.D.U. KansasDavid WhipplePh.D.U. KansasChester WrightM.S.U. Kansas	AP
Robert NickersonPh.D.Stanford*James O'HareM.S.Naval Postgraduate SchoolClair PetersonPh.D.MITDenise RousseauPh.D.U. C. BerkeleyRobert SagehornM.S.Naval Postgraduate SchoolNorman SchneidewindD.B.A.U. Southern CaliforniaJohn SengerPh.D.Illinois*Walter SkierkowskiM.S.U. NebraskaGeorge ThomasPh.D.PurdueRoger Weissinger-Baylon Ph.D.StanfordDavid WhipplePh.D.U. KansasChester WrightM.S.U. Kansas	AP
*James O'HareM.S.Naval Postgraduate SchoolClair PetersonPh.D.MITDenise RousseauPh.D.U. C. BerkeleyRobert SagehornM.S.Naval Postgraduate SchoolNorman SchneidewindD.B.A.U. Southern CaliforniaJohn SengerPh.D.Illinois*Walter SkierkowskiM.S.U. NebraskaGeorge ThomasPh.D.PurdueRoger Weissinger-Baylon Ph.D.StanfordRon WeitzmanPh.D.U. KansasDavid WhipplePh.D.U. KansasChester WrightM.S.U. Kansas	aP
Clair PetersonPh.D.MITDenise RousseauPh.D.U. C. BerkeleyRobert SagehornM.S.Naval Postgraduate SchoolNorman SchneidewindD.B.A.U. Southern CaliforniaJohn SengerPh.D.Illinois*Walter SkierkowskiM.S.U. NebraskaGeorge ThomasPh.D.PurdueRoger Weissinger-Baylon Ph.D.StanfordRon WeitzmanPh.D.PrincetonDavid WhipplePh.D.U. KansasChester WrightM.S.UCLA	I
Denise RousseauPh.D.U. C. BerkeleyRobert SagehornM.S.Naval Postgraduate SchoolNorman SchneidewindD.B.A.U. Southern CaliforniaJohn SengerPh.D.Illinois*Walter SkierkowskiM.S.U. NebraskaGeorge ThomasPh.D.PurdueRoger Weissinger-Baylon Ph.D.StanfordRon WeitzmanPh.D.PrincetonDavid WhipplePh.D.U. KansasChester WrightM.S.U. Kansas	AP
Robert SagehornM.S.Naval Postgraduate SchoolNorman SchneidewindD.B.A.U. Southern CaliforniaJohn SengerPh.D.Illinois*Walter SkierkowskiM.S.U. NebraskaGeorge ThomasPh.D.PurdueRoger Weissinger-Baylon Ph.D.StanfordRon WeitzmanPh.D.PrincetonDavid WhipplePh.D.U. KansasChester WrightM.S.UCLA	aP
Norman SchneidewindD.B.A.U. Southern CaliforniaJohn SengerPh.D.Illinois*Walter SkierkowskiM.S.U. NebraskaGeorge ThomasPh.D.PurdueRoger Weissinger-Baylon Ph.D.StanfordRon WeitzmanPh.D.PrincetonDavid WhipplePh.D.U. KansasChester WrightM.S.UCLA	I
John SengerPh.D.Illinois*Walter SkierkowskiM.S.U. NebraskaGeorge ThomasPh.D.PurdueRoger Weissinger-Baylon Ph.D.StanfordRon WeitzmanPh.D.PrincetonDavid WhipplePh.D.U. KansasChester WrightM.S.UCLA	Р
*Walter SkierkowskiM.S.U. NebraskaGeorge ThomasPh.D.PurdueRoger Weissinger Baylon Ph.D.StanfordRon WeitzmanPh.D.PrincetonDavid WhipplePh.D.U. KansasChester WrightM.S.UCLA	Р
George ThomasPh.D.PurdueRoger Weissinger-Baylon Ph.D.StanfordRon WeitzmanPh.D.PrincetonDavid WhipplePh.D.U. KansasChester WrightM.S.UCLA	I
Roger Weissinger-Baylon Ph.D.StanfordRon WeitzmanPh.D.PrincetonDavid WhipplePh.D.U. KansasChester WrightM.S.UCLA	Ad,
Ron WeitzmanPh.D.PrincetonDavid WhipplePh.D.U. KansasChester WrightM.S.UCLA	AP
David Whipple Ph.D. U. Kansas Chester Wright M.S. UCLA	AP
Chester Wright M.S. HCLA	AP
	aP

<u>KEY</u> ::	Р	Full Professors
	AP	Associate Professors
	aP	Assistant Professors
	Adj	Adjunct Professors

de.

-

- -

I Instructors

*

Persons with Military Rank



